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ABSTRACT

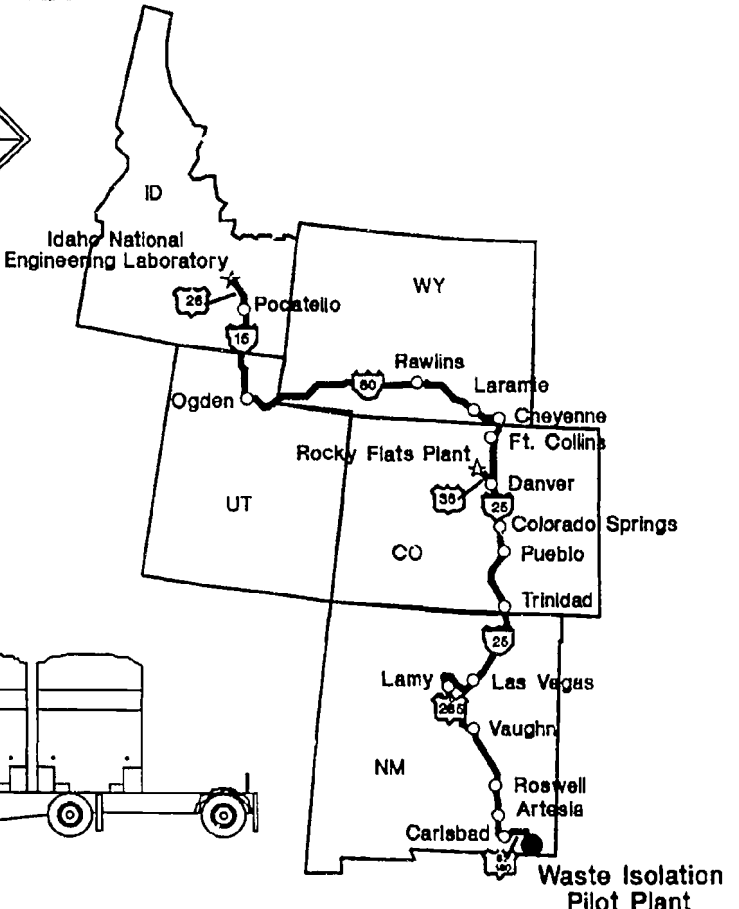
This 12-section course is designed to explain the responsibilities of an incident commander at the scene of a Waste Isolation Pilot Plant (WIPP) transportation incident. It was created for the U.S. Department of Energy WIPP located near Carlsbad, New Mexico, which receives radioactive shipments. The course has two purposes: (1) to provide first responders with the necessary knowledge to respond safely; to protect themselves, the public, and the environment; and (2) to describe the function of the Incident Command System, the Radiological Assistance Team procedures, and the TRUPACT-II (Transuranic Package Container) recovery methods. Section 1 is an introduction that defines WIPP oversight and mission and identifies TRU (transuranic) defense waste generating and storage sites. Each of sections 2-11 consists of a list of enabling objectives and informational material. Topics include the following: introduction to radiation, waste acceptance, transportation regulations, package design, emergency response, first responder actions, contamination control (decontamination), incident command system, radiological assistance team operations, and TRUPACT-II recovery. Section 12 contains these sample forms and checklists: incident command system matrix, fire and hazardous materials worksheet, decision matrix, field report, hazardous materials incident evaluation, and resource list. Appendixes include a glossary and a list of acronyms and abbreviations appearing in the text. (YLB)

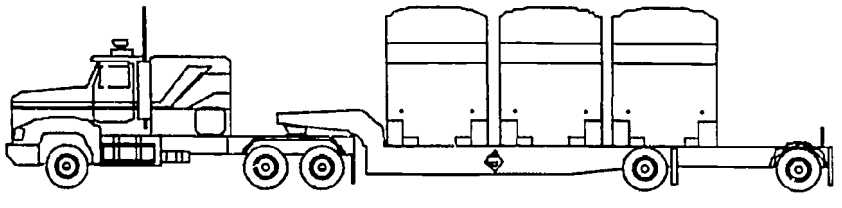
Revision Three

Command and Control

Radiological Transportation Emergencies Course

United States Department of Energy
Waste Isolation Pilot Plant
Carlsbad, New Mexico





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DISCLAIMER

This course is not designed to meet the training requirements of 29 CFR 1910.120 (q)(6) for "First Responder Operations Level," "First Responder Awareness Level," "Hazardous Materials Technician," "Hazardous Materials Specialist," nor "On-scene Incident Commander" as this course addresses only potential Waste Isolation Pilot Plant (WIPP) hazards. These levels of competency require more hours of training or additional specific areas of competency than will be presented in this course. This WIPP course is intended to enhance existing emergency response programs to include transuranic (TRU) waste and radiological materials response capabilities.

COMMAND AND CONTROL
Radiological Transportation Emergencies Course

Table of Contents

Section 1
INTRODUCTION

Welcome to the Command and Control for Radiological Transportation Emergencies Course related to the radioactive shipments destined for the U.S. Department of Energy Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico. The U.S. Department of Energy, your state, local, or tribal government, and Westinghouse Electric Corporation (the primary operating contractor of the WIPP) have jointly coordinated this program for your benefit.

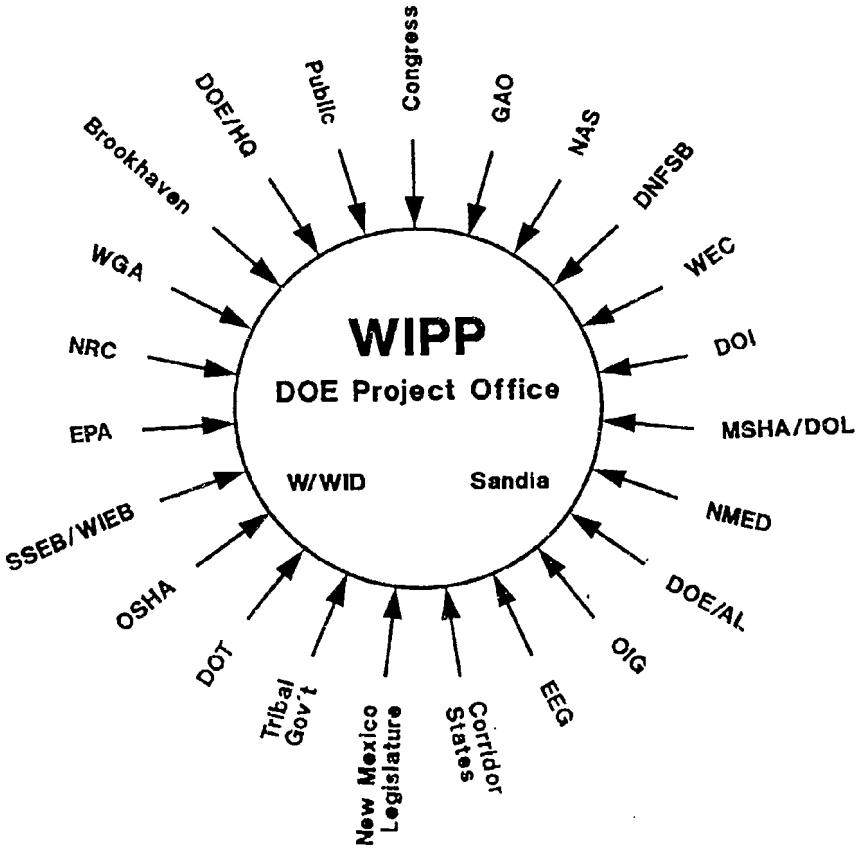
Your instructors are employees of Westinghouse Electric Corporation with numerous years of fire fighting, emergency medical services, law enforcement, and/or emergency preparedness experience.

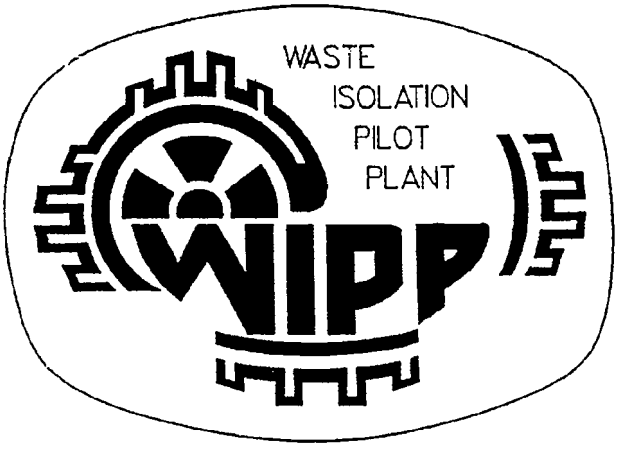
You should, at the completion of this course, have a thorough understanding of your responsibilities as Incident Commander (I.C.) at the scene of a WIPP transportation incident. Included in this training will be those actions that will be required to protect yourself, the public, and the environment.

Although this is a WIPP-specific course, many things reflected in the instruction will parallel other hazardous material training you may have received previously. Conversely, any instruction you receive here may be carried over to other hazardous material accidents. In regard to WIPP shipments, the information being presented today is extremely conservative. Due to the packaging of the transuranic waste being shipped, the chance of a TRUPACT-II or remote-handled cask breach is extremely remote.

The term "First Responder" referenced in this manual and for the purpose of this course refers to the emergency medical technicians, fire fighters, law enforcement officers, rescue squad members, or others performing as a part of a community emergency response system or as dictated by the state or tribal government.

WIPP's OVERSIGHT





This course is sponsored by the U.S. Department of Energy (DOE), Westinghouse Electric Corporation, and your state and local governments with the assistance of your local emergency response agencies.

The DOE plans to ship transuranic waste to the WIPP in southeastern New Mexico. "Pilot" is the key word in the WIPP title; the WIPP is a one-of-a-kind facility. The plant is so unique that at least seven foreign nations (Japan, England, and France, to name a few) are watching the progress of the plant. The technology that is being developed will have a major impact on radioactive waste storage/disposal/transport throughout the world.

You are encouraged to ask questions. The instructor will make every effort to see that your questions are answered.

COURSE TERMINAL OBJECTIVE

Successful completion of this course will provide first responders with the necessary knowledge to respond safely; to protect themselves, the public, and the environment; and to describe the function of the Incident Command System, the Radiological Assistance Team procedures, and the TRUPACT-II recovery methods.

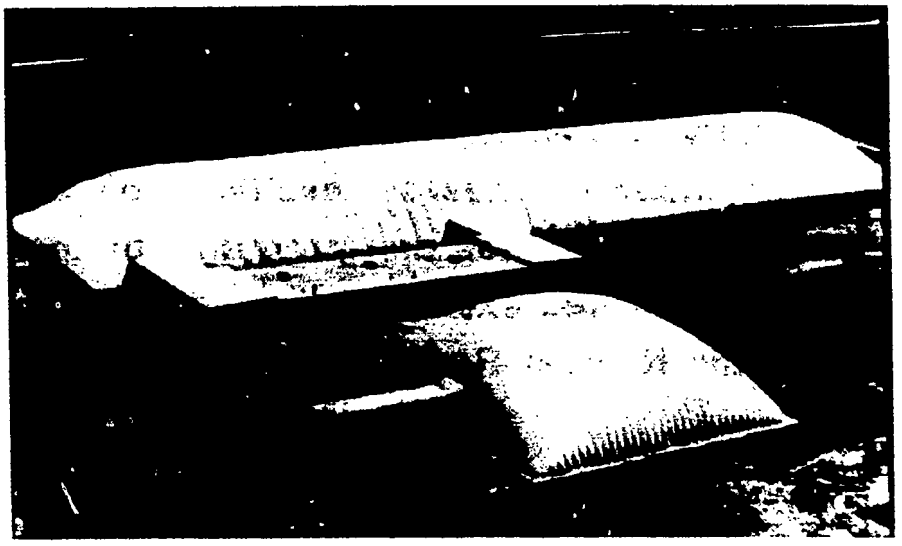
Mastery of the course terminal objective will be demonstrated by scoring 70% or higher on the post-course examination and showing a proficiency of skill using the landscape models.

WIPP MISSION

To provide a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States exempted from regulation by the Nuclear Regulatory Commission.

Public Law 96-164

The WIPP is a research and development facility designed to demonstrate deep geological disposal of transuranic waste. It is located approximately 30 miles east of Carlsbad, New Mexico, in the Chihuahuan desert. The projected life of the WIPP is twenty-five years. During the initial Test Phase of the project, operations will be dedicated to research the behavior of the salt rock and transuranic waste under specific conditions, and to carry out operational demonstrations. All waste that is emplaced during the Test Phase must be retrievable. At the end of this time, the plant and all the experiments conducted will be evaluated to ensure that this is a safe method of isolating these materials.

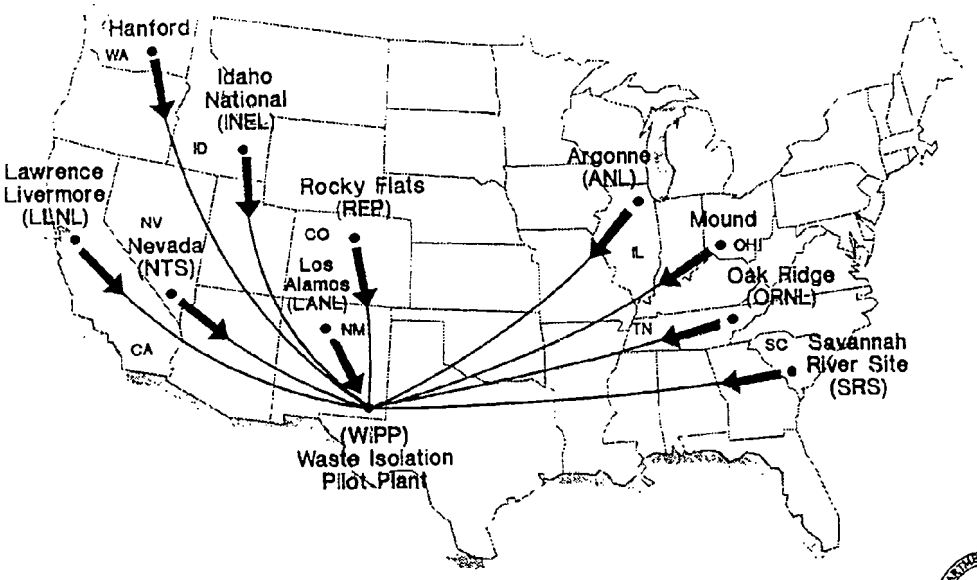


All ten generator sites have some type of storage facility. The above storage facility is located at Idaho National Engineering Laboratory and is an air-supported building resting on asphalt. This is one of the many types of storage facilities used at the Department of Energy's existing temporary storage sites.

Contact-handled (CH) waste is packaged in 55-gallon drums or, for the test program, test bins inside standard waste boxes.

The dose rate from the radioactive material contents is low enough to allow radiation workers to physically come in contact with and handle the waste containers.

TRU DEFENSE WASTE GENERATING AND STORAGE SITES



There are ten sites across the nation that generate or store transuranic waste destined for the WIPP.

- Idaho National Engineering Laboratory, Idaho
- Rocky Flats Plant, Colorado
- Hanford Reservation, Washington
- Savannah River Plant, South Carolina
- Los Alamos National Laboratory, New Mexico
- Oak Ridge National Laboratory, Tennessee
- Nevada Test Site, Nevada
- Argonne National Laboratory - East, Illinois
- Lawrence Livermore National Laboratory, California
- Mound Laboratory, Ohio

All these sites are run by the Department of Energy. There will be no waste shipped to the WIPP from commercial sites.

During the Test Phase of the project, waste will be received only from Idaho and Colorado.

Section 2
INTRODUCTION TO RADIATION

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Define "ionizing radiation"

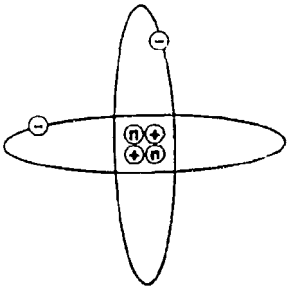
2) Explain the difference between:

   Exposure and Contamination
   Dose and Dose Rate

3) List the three types of radiation associated with WIPP shipments and know the type of shielding necessary for each

4) Define "half-life" and "activity"

5) Explain the effects of acute whole body exposure



ATOMIC STRUCTURE

- **All matter is made up of atoms**
- **Atoms are invisible to the naked and assisted eye**
- **Nucleus consists of protons ⊕ and neutrons ⓝ very close to each other**
- **Electrons ⊖ orbit the nucleus at a relatively great distance**

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STABLE ATOMS: If an atom has the right amount of energy, it is said to be "stable." Several things assist the atom to remain in this state.

- Electrical Balance: Equal numbers of negatively charged electrons orbiting a nucleus containing the same number of positively charged protons. (electrical cancellation)

- Neutron to Proton Ratio: Stable atoms have a certain number of neutrons per proton in the nucleus. Sometimes, their numbers are the same, but they don't have to be. If the atom has more neutrons than it is supposed to, it becomes unstable; it has too much energy.

IONIZING RADIATION

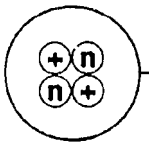
- **Ionization removes one or more electrons from an atom**
- **As ions, atoms are very chemically reactive**
- **These reactions can result in changes to the cells of the human body**

When radiation interacts with an atom, it transfers some or all if its energy to that atom. The atom may become excited, which means the electrons circling the nucleus of the atom in prearranged shells may jump from one shell to another. Or an electron will leave the atom, and the atom will be ionized. The result is called an ion pair. An electron [negative charge (-)] is stripped from the atom.

The atom is no longer electrically neutral; it has a net positive (+) electrical charge. If this ionization occurs to the atoms in our bodies, the water molecules (H_2O) can be changed to hydrogen peroxide (H_2O_2), and chemical damage to the cells can occur. Radiation from such things as electrical power, radio, television, microwave, visible light, and ultraviolet can cause excitation to occur but not ionization. Alpha, beta, gamma, and neutron radiations can cause excitation and ionization to occur.

Radiations such as alpha, beta, and gamma are powerful enough to cause ionization to occur when they interact with atoms. Since all matter is composed of atoms (including ourselves), and damage can occur from ionization of atoms in our cells, exposure to ionizing radiation requires protection. Ionizing radiation cannot be detected by our senses: touch, taste, smell, sight, or hearing. We must use radiation detectors (survey meters) to know when and how much radiation is present.

For practical purposes, the kind of radiation we need protection from is defined as IONIZING RADIATION as it relates to a WIPP shipment.



ALPHA (α) PARTICLE

- **Charged particle**
- **Typical range in air about 2 inches**
- **Primary radiation emitted from WIPP waste**
- **Internal hazard only**
- **Special probes are required to detect alpha particles**

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Particulate radiation does have mass (although too small to see) and travels nearly as fast as electromagnetic radiation.

The alpha particle is emitted from the nucleus of the atom. It has a mass of four and a charge of two and contains two neutrons and two protons. Compared to other particle radiation it is large.

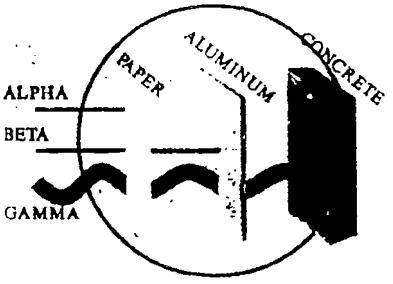
It is an internal hazard only. This means that it must be ingested, inhaled, or absorbed to do harm to living body cells.

Alpha radiation is the most significant hazard involved in the WIPP shipments.

Special skills are needed in using alpha-detecting instruments. It may be nearly impossible to detect alpha particles in snow, sleet, or rain. The alpha particle requires special detectors for monitoring.

Alpha and beta particle decay occurs in a process called charged particle interaction. Alpha particles decay from radioactive materials that need to get rid of a lot of energy in order to become stable.

The alpha particle travels in a straight path, slowly, at about 10 - 20% of the speed of light. It interacts electrically with the negatively charged electrons, orbiting around the nucleus of other atoms causing excitation (moving an electron from one shell to another), or ionization (stripping an electron from an outer shell) along the alpha particle's path. After capturing two electrons, the alpha particle becomes a helium atom and causes no further ionization.



ALPHA SHIELDING

- Alpha radiation is easily stopped by:
  - An ordinary sheet of paper
  - Outer layer of the skin

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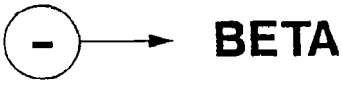


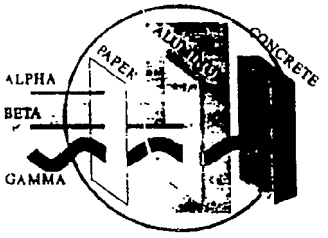
BETA (β) PARTICLE

- **Charged particle**
- **Can be an external hazard but is primarily an internal hazard**
- **Emitted from the nucleus**
- **Has mass and charge equal to an electron**

Beta particles can travel at speeds approaching the speed of light (faster than an alpha particle). The faster they travel, the higher their initial energy. There is a greater chance for deflection, and less ionization occurs than in alpha interactions.

Beta particles contain the same electrical charge as the electron. When beta decay occurs, a neutron in the nucleus of an atom splits into a proton that remains in the nucleus and a beta particle that is ejected from the nucleus.

Beta particles are smaller than alpha particles. Beta particles therefore have a greater range; they can travel from inches to around twenty feet in air, depending on the source.



BETA SHIELDING

- **Beta radiation is easily stopped by:**
  - **A thin piece of tin or aluminum**
  - **Eye protection**
  - **Layer of clothing**
  - **Inches to twenty feet of air**

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Eye protection, such as plastic glasses, fire fighters' face shields, and self-contained breathing apparatus (SCBA) are effective shielding for alpha and beta radiation.

GAMMA RAY (γ)

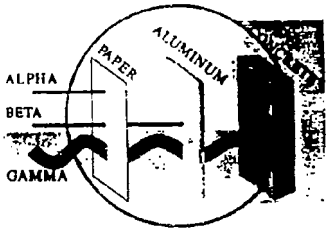
- **Electromagnetic radiation, as opposed to a particle**
- **Range depends on energy of the gamma ray**
- **Gamma rays have no mass and no charge**
- **Internal and external hazard**

Electromagnetic radiation is energy that travels in waves at the speed of light and has no electrical charge.

Gamma rays are commonly emitted from the nucleus of atoms that have already emitted an alpha or beta particle and still have excess energy. Gamma rays have no mass, but their energy can interact with atoms causing ionizations to occur. Whatever the reason for an atom having excess energy, gamma emissions allow the nucleus to reduce its energy state without losing (changing) mass and return to normal or ground state.

Gamma rays can travel considerable distances.

X-rays are their cousins, but people are familiar with them.



GAMMA SHIELDING

- **Several feet of concrete or several inches of lead or stainless steel are required to stop most gamma rays**
- **Gamma rays can pass into and through the human body**

Radiation emitted from contact-handled WIPP packages is not sufficient to require shielding. Exposure to gamma radiation will NOT cause the material absorbing the gamma radiation to become radioactive.

EXPOSURE

- **The amount of ionization in air caused by gamma or X-rays**
- **Exposure is measured in units of roentgens (R). You may recognize this in shipping papers as R/hr or mR/hr**
- **A "milli-roentgen (mR)" equals 1/1000 of a roentgen**

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A "roentgen" is a unit of exposure of gamma (or x-ray) radiation in the air. This unit of energy measurement is useful to you in calculating your exposure. Knowing how may roentgens (how many Rs) of gamma radiation are present in the air can tell you how much radiation you are exposed to. Knowing this, safe stay-times in the area can be determined.

CONTAMINATION

- **Radioactive material in any place where it is not supposed to be. Contamination can be found on people, equipment, clothing, vehicles, the ground, vegetation, etc., . . .**

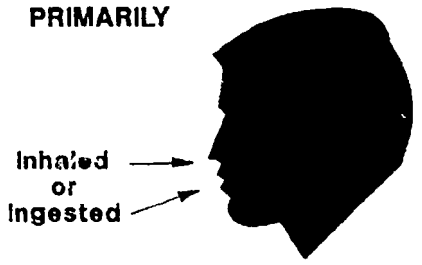
Contamination is particulate; radiation is energy.

The contact-handled TRUPACT-II is not likely to release material and cause contamination unless the accident forces are extremely severe.

If external contamination did occur, most of it could easily be removed from the body by removing clothing and washing exposed areas of skin with soap and water. The first responder should then be surveyed with the proper radiation detection instrument to ascertain that all external contamination has been removed. If contamination is found to remain on the body, the affected area should be rewashed and surveyed again.

Internal contamination requires much more sophisticated survey procedures that can only be accomplished in qualified hospitals.

INTERNAL INTAKE METHODS



- **Radioactive material may also enter the body by absorption and cuts in the skin**

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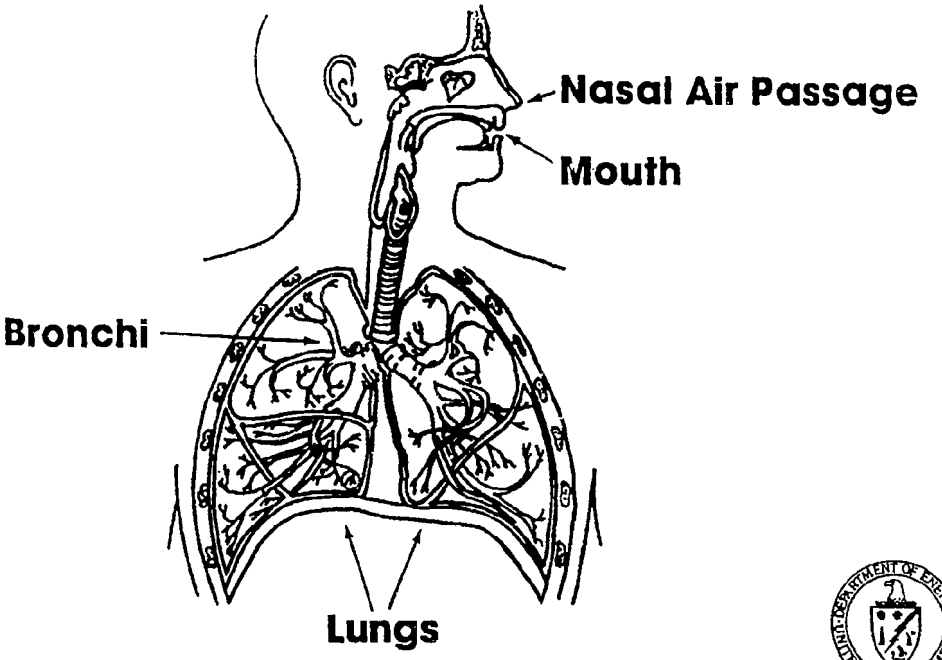
If you suspect or confirm that a TRUPACT-II is breached, stay upwind. This represents a potential internal hazard. Also, if you receive external contamination from a release, you should be examined for internal contamination.

If you do receive some internal contamination, you will not feel anything unusual, nor will you exhibit any immediate physical symptoms. Confirmation of internal contamination can only be made by medical and health physics personnel using very sophisticated equipment.

Although the sources of medical aid for ingestion and inhalation vary from region to region, your state emergency management or radiological health agencies will take the lead and ensure aid is acquired. Historically, there has never been an emergency responder injured or killed as a result of a radioactive materials accident in this country.

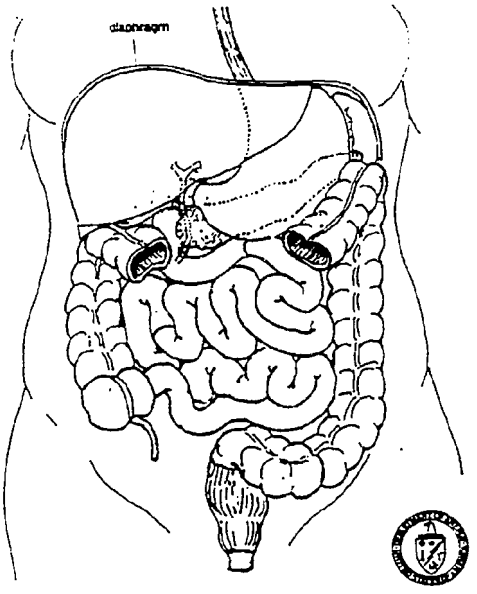
RESPIRATORY TRACT



When radioactive materials are inhaled, a percentage will be expelled and a percentage may be retained in the lung. Some of the material that has been retained in the lung will be coughed up and swallowed.

If part of the material is retained in the lung, it may result in some biological effect. Its presence can only be detected using very sophisticated equipment. You will not have any outward physical response or sense of inhaling this material at the accident scene.

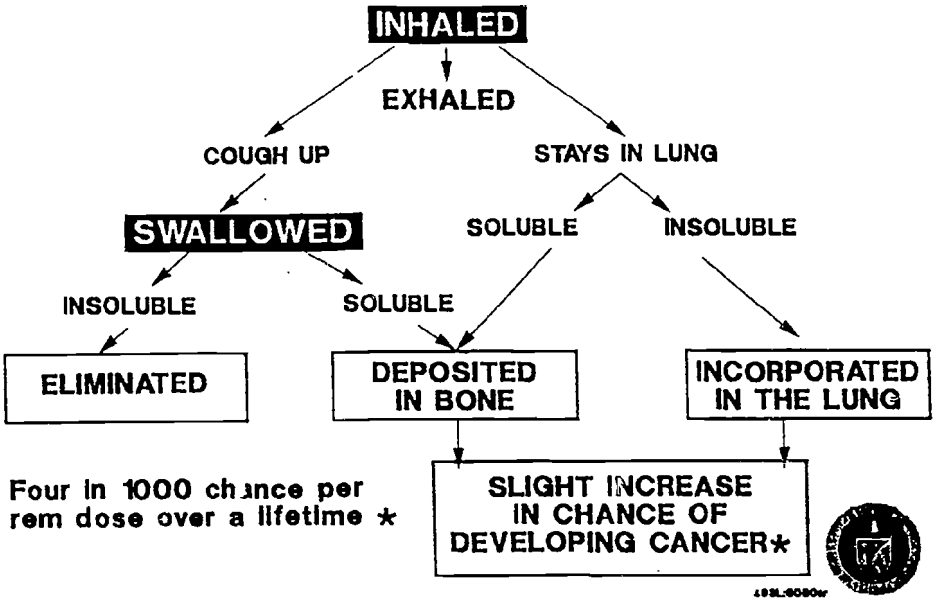
DIGESTIVE SYSTEM



Ingested radioactive material may pass through the body (insoluble) and pose essentially no health risk due to the radioactive properties of the material. The material may be absorbed and still not cause direct damage to the gastrointestinal tract (soluble). But, depending on the radioactive material, it may cause considerable damage to the organ or tissue where it was deposited.

Only with the advice of trained personnel and specialized equipment will it be possible to determine the amount of radioactive material ingested and the projected effects.

BIOLOGICAL HAZARDS OF PLUTONIUM



If intake has occurred, a physician must determine the treatment necessary to accelerate the elimination of plutonium from the lungs or digestive tract. Solubility is a function of the chemical nature of the material. Basically, a material that is soluble can be dissolved. Most of the plutonium in the WIPP shipments is in the insoluble form. Once in the body (bone or lung), plutonium is eliminated very slowly. This slow elimination period can result in a significant dose to the internal organs over a long period of time.

* NCRP-65 (April 1980) Management of Persons Accidently Contaminated with Radionuclides

EFFECTS OF ACUTE WHOLE BODY EXPOSURE

	(Approximate Dose) mrem
• **Detectable changes in blood**	**50,000**
• **Onset of radiation sickness**	**100,000**
– **Diarrhea**	
– **Nausea**	
– **Vomiting**	
• **Strong chance of death**	**500,000**

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The Supplemental Environmental Impact Statement (Vol. 2, pg. D-99) for the WIPP states that the maximum radiation dose an individual would receive at a bounding (worst case) accident would be 160-180 mrem.

A bounding case accident is defined as one where all TRUPACT-IIs are breached equally and all Type A packages are also equally breached with contents from the Type A packages scattered in the immediate area.

ACUTE VERSUS CHRONIC EXPOSURE

- **Radiation damage to the body is dose rate dependent i.e., larger dose in a shorter time period will cause more damage**
- **The body capability of repairing radiation damage is a function of radiation amount received**

  For Example:

  200,000 mrem to the whole body in one hour will most likely result in radiation sickness. However, a radiation worker receiving 200,000 mrem over 40 years will not exceed his regulatory limit and may have no determinable health effects

The radiation dose of a first responder who is not a radiation worker should not exceed 20,000 mrem over four years. This is based on current regulations (10 CFR 20). The dose limits of 100,000 mrem for lifesaving activities and 25,000 mrem for saving property are the maximum recommended doses.

ACTIVITY

- **Number of radioactive atoms that will decay and emit radiation in one second of time**
- **The curie is the unit of activity**
- **One curie = 37 billion disintegrations per second**

The "curie" is the activity of that quantity of radioactive material in which 3.7×10^{10} atoms are transformed per second. It is the number of radioactive atoms that will decay and emit radiation in one second. One curie is equal to 37 billion disintegrations per second. It is not a function of weight or volume. Units of activity or curies may be found on shipping papers and on package labels. Although the shipping papers and labels indicate the level of activity present, knowledge of potential radiation levels is more useful to the first responder.

This unit of measurement tells you how much radioactivity is present and not how much material is present.

Since the curie represents a great deal of activity, it is usually divided into smaller units such as millicuries (1/1000 of a curie) or microcuries (1/1,000,000 of a curie).

Knowing the number of curies in a radioactive material may be useful in determining safe handling procedures for a material or calculating expected exposure from the material.

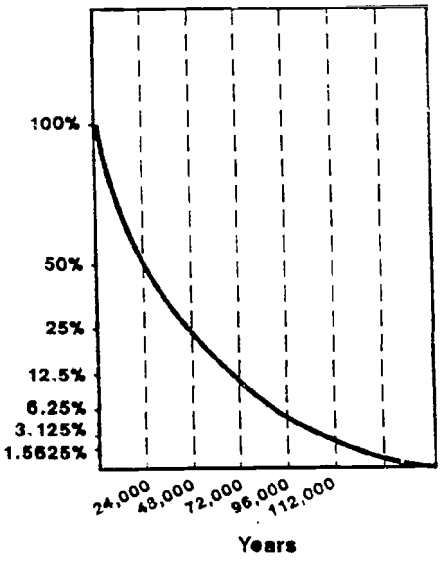
DOSE AND DOSE RATE

- **Dose is the amount of energy (radiation) absorbed in a unit volume**
- **The unit most applicable is the rem**
- **The rem relates energy absorbed to tissue damage**
- **Dose rate is the dose received per unit time, typically rem/hr or mrem/hr**

The unit of biological dose or dose equivalent is known as the "rem" (Roentgen Equivalent Man). A more frequently used unit for radiation dose is the millirem (mrem) which is 1/1000 of a rem. This unit of measurement is used frequently by radiation personnel when talking about dose.

For the first responder, the terms "rem/hr," "mrem/hr," "R/h," or "mR/hr" are essentially the same.

HALF-LIFE



Transuranic isotopes have long "half-lives." For example, Pu 239 has a half-life of 24,000 years. This means that half the Plutonium 239 (for example) produced today will still be around 24,000 years from now.

Decay is not something that can be measured at the accident scene, nor is it of importance to the first responder.

Ten half lives are essentially zero.

Section 3
WASTE ACCEPTANCE

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Define "transuranic"

2) Describe the physical characteristics of transuranic waste

3) Define "mixed waste"

4) Give examples of mixed waste

5) Describe two types of verification techniques used at the generator sites to verify package contents

Almost all the transuranic (TRU) waste that will be transported to and disposed of at the WIPP consists of everyday items such as rags, rubber gloves, shoe covers, cloth lab coats, and plastic bags. Heavier items may include valves, pumps, motors, tools, and laboratory glass. Contact-handled waste is so defined because no special provisions or procedures are required to directly handle the drums or standard waste boxes and test bins.

TRANSURANIC WASTE CHARACTERISTICS

- Atomic number greater than 92 (uranium)
- Alpha emitter
- Half-life greater than 20 years
- Concentrations greater than 100 nanocuries per gram of waste
- Trash (rags, coveralls, gloves, equipment, tools) contaminated with transuranic elements (plutonium (Pu), curium (Cm), americium (Am), and californium (Cf))

Transuranic waste consists of items contaminated with amounts of transuranics not economically feasible to recover.

Examples of TRU waste:

- Rags
- Rubber gloves
- Shoe covers
- Cloth lab coats
- Plastic bags
- Electrical components
- Laboratory glass
- Metalware

All waste received by the WIPP has been created by nuclear defense activities.

This waste will NOT include explosives, compressed gases, more than one percent free liquid per container, or pyrophoric metals.

The radioactive material can not be detected by sight or smell, but the waste materials will be visible in the unlikely event a TRUPACT-II is damaged to the point of releasing its contents. For this to occur, the accident force must be great enough to cause the outer skin, the foam, the outer container, the inner container, and the Type A package inside the TRUPACT-II to be breached. Related information can be found in Module 6, "Package Design."

MIXED WASTE

- **Radioactive waste co-contaminated with hazardous chemical constituents as defined in federal law and by the Department of Energy**

793R:6182c

MIXED WASTE

The chemical properties of the waste are determined by the chemical constituents allowed in a given waste type (e.g., solidified aqueous or homogenous inorganic solids is Waste Type I). These constituents are restricted so that all the payload containers are safe for handling and transport.

Chemical constituents in a payload shall not be in a form that could be reactive during transport. Specifically, three types of chemical constituents are prohibited from a TRUPACT-II payload.

One prohibited type is explosive material. An explosive is defined as: "Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion (i.e., with substantial instantaneous release of gas and heat)".

Examples of explosives are ammunition, dynamite, black powder, detonators, nitroglycerine, urea nitrate, and picric acid.

A second type of prohibited material is pyrophorics. A pyrophoric is defined as: "A flammable solid which, under transport conditions, might cause fires through friction or retained heat, or, which can be ignited readily, and when ignited, burns vigorously and persistently so as to create a serious transportation hazard. Included in the pyrophoric definition are spontaneously combustible materials, water reactive materials, and oxidizers."

Pyrophoric radioactive materials shall be present only in small residual amounts (<1 weight percent) in payload containers. Examples of pyrophoric radionuclides are metallic plutonium and americium. Transuranic metals are highly reactive and must be handled in a nitrogen atmosphere to prevent rapid surface oxidation. Therefore they are oxidized to nonreactive form prior to placement in a payload container. The total quantity of fissile radionuclides is also controlled by criticality safety limits. Nonradioactive pyrophorics (e.g., organic peroxides, sodium metal, chlorates, etc.) shall be reacted (or oxidized) and rendered nonreactive prior to placement in the payload container.

A third prohibited material is corrosives. Corrosives are defined as: "Aqueous materials which have a pH less than 2 or more than 12.5."

Acids and bases which are potentially corrosive shall be neutralized and rendered noncorrosive prior to being included in the waste. The physical form of the waste and waste generating procedures at the sites ensure that the waste is in a nonreactive form.

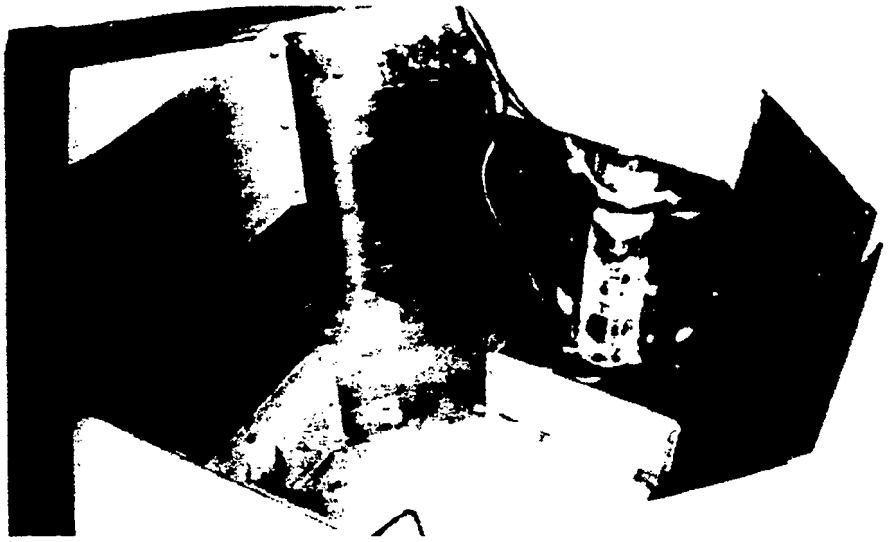
A fourth material that is restricted is the total amount of potentially flammable organics which can occur in the headspace of a payload container. Total concentration of potentially flammable organics shall be limited to 500 ppm in the headspace of a payload container.

PROTECTION FROM HAZARDOUS CHEMICALS

- **Protective clothing used for hazardous chemicals or materials will also protect the first responder from alpha and beta radiation within a WIPP shipment**

793R:6162b

The protective clothing that is worn for other hazardous material accidents is adequate for your protection in a WIPP incident, as the amount of other hazardous chemicals is typically in the parts-per-million range.



The above slide shows an actual radioassay device that is used to measure the radioactive material contents of a package. It is a cross-check used to verify the amount of radioactive materials in the package. This inspection is done at the generator site prior to shipment to the WIPP.

Another method to ensure the waste shipped to the WIPP in drums meets the established acceptance criteria is real-time radiography (X-ray, below). This is very similar to the radiography used at airports to check carry-on luggage. This equipment will verify that the drums contain less than one percent free liquid, no bulk chemicals are inside, and that all aerosol cans have been punctured. This verification is also accomplished at the generator site prior to shipment to the WIPP. It verifies that process controls were adhered to. In the examples, segregation requirements.

Section 4
TRANSPORTATION REGULATIONS

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) State what information is contained on the shipping documents

2) State what placards are, their color in regard to WIPP shipments, their location on the vehicle, and how placards are determined

3) State what labels are, how they are determined, where they are positioned on the packages, and their physical considerations

4) State the size of the "empty" label and when it will be used

5) State what the TRANSCOM system is and what type of information will be transmitted by the system

6) Identify the type of communication equipment that is carried in the cab of the vehicle

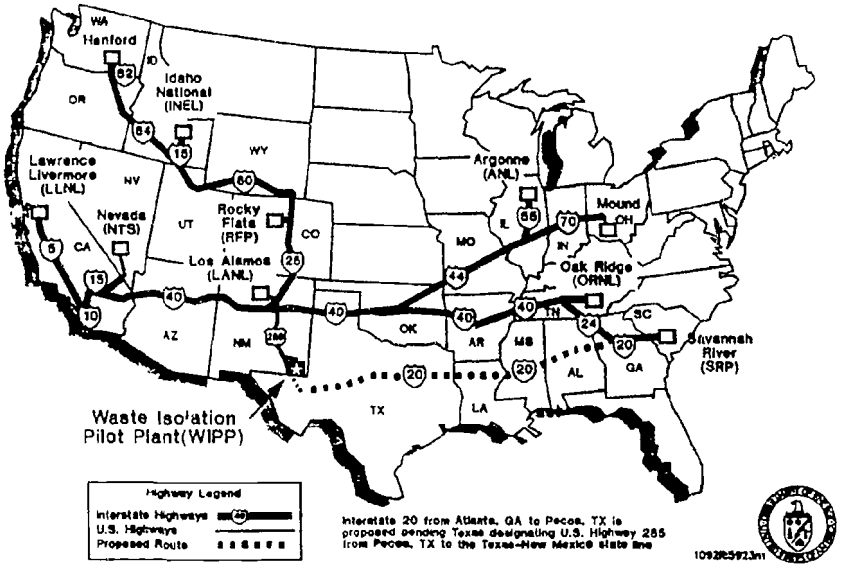
NATIONAL ACADEMY OF SCIENCES PANEL CONCLUDED

"The system proposed for transportation of TRU waste to WIPP is safer than that employed for any other hazardous material in the United States today and will reduce risk to very low levels".

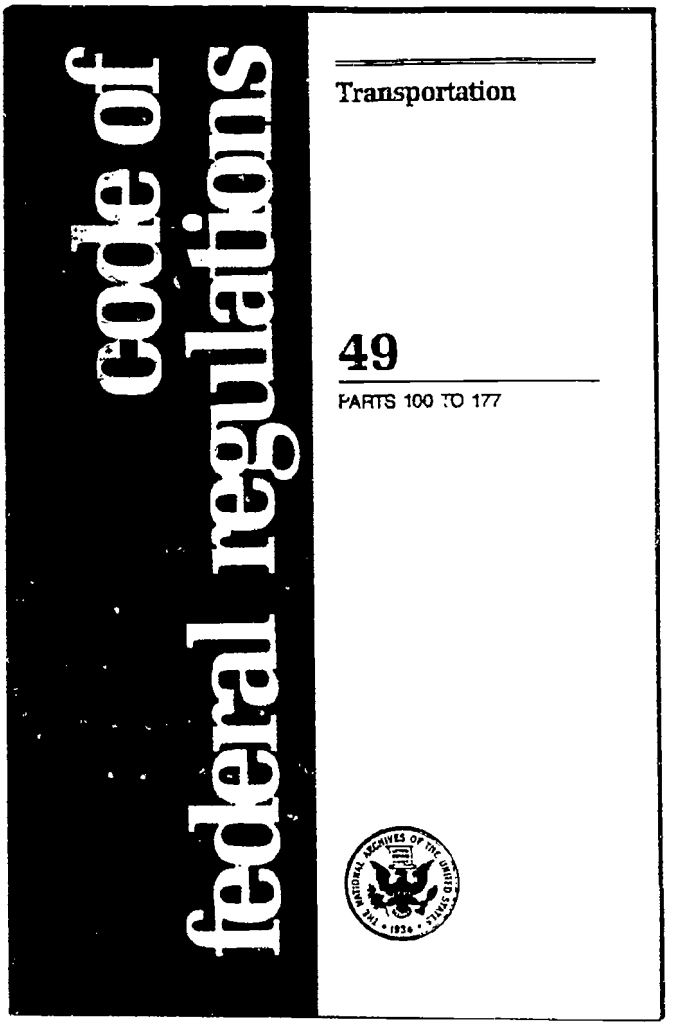
July 1989

This statement was made when the transportation system was only seven months old. Numerous improvements and refinements have been made since then.

PROPOSED WIPP DISPOSAL PHASE SHIPPING ROUTES



Routing through your state is illustrated on the above map. Selection of routes is based on U.S. Department of Transportation (DOT) regulation 49 CFR 177.825 (Routing and Training Requirements for Radioactive Materials). Interstate highways and their alternates are used, when available, based on their safety features and the directness of their routes. States can designate alternate routes provided that they follow established Department of Transportation regulations [49 CFR 177.825 (b)(1)(ii)]. Therefore, the actual routes used may differ from those shown in this map.



The Department of Transportation's Code of Federal Regulations Volume 49 (49 CFR), Parts 100-177, regulates the interstate transportation of hazardous materials. 49 CFR regulates the information required to be placed on shipping papers, placarding, labeling, or packaging, in addition to defining the requirements for drivers' qualifications. training, and routing.

The shipping papers containing information of the shipment being transported to the WIPP can be found in the door pocket on the driver's side of the vehicle. These papers will consist of several pages. The driver will surrender these papers upon request.

As required by 49 CFR 172, Subpart C, 200-205, the shipping papers contain an abundance of information. The information that will be useful to you at the scene includes:

Origin (consignee)

Destination (consignor)

Identification of the radioactive material

Proper shipping name including the identification number (UN or NA)

Emergency telephone numbers

An example of the shipping papers for a WIPP-related shipment is on the following page. Be aware that each shipper has its own format. When looking for documentation about the shipment, headings like "Bill of Lading" or "Radioactive Materials Shipment Record" are helpful. These papers will be kept in the driver's door pocket on all WIPP shipments.

NOTE: For specific information on Radioactive Materials Shipping paper requirements, see 49 CFR 172.203 (d).

STRAIGHT BILL OF LADING - SHORT FORM - Shipping Order - to be retained by Agent FORM EG&G-387 (Rev. 02-84)

(This instrument is not a bill of lading when the property described below is moved in a vehicle owned than that of a common carrier) furnished and/or operated by shipper or owner of the property, but is merely a receipt for said property on behalf of shipper or owner.)

Shipper's No. XXXX3C **2**

_____ TRUCKING _____ Carrier Carrier's No. _____

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of of this Bill of Lading.

From EG&G Idaho, Inc. for Department of Energy Date 3-14-90 19____

at Idaho National Engineering Laboratory Scoville Butte County Idaho

If or when this instrument constitutes a Bill of Lading

The property described below, in apparent good order, is received by the carrier shown hereon, which carrier agrees to transport to the consignee and deliver as shown hereon subject to the terms and conditions of the special contract between the carrier and the consignor or consignee in effect on the date of the issue of the Bill of Lading. In the absence of a special contract, transportation will be subject to all the terms and conditions of the carrier's lawful tariffs legally on file. It is further agreed by the carrier that the transportation of the shipment will be performed in compliance with all applicable rules, regulations and laws.

Consigned to WESTINGHOUSE WASTE ISOLATION PILOT PLANT (Mail or street address of consignee—For purposes of notification only.)

Destination CARLSBAD, NM 88221- State County

Delivery Address* (*To be filled in completion shipper desires and governing tariffs provide for delivery thereon)

Route

Delivering Carrier Car or Vehicle Initials No.

Collect On Delivery $ and remit to Street City State

C.O.D. charge to be paid by Shipper ☐ Consignee ☐

NO. PACKAGES	HM	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (Sub to Cor.)	CLASS OR RATE	CHECK COLUMN
1	RQ	RADIOACTIVE MATERIAL, FISSILE, N.O.S. UN2918 (Pu238 Pu239 Pu240 Pu241 Am241) Pu242 7.003 CURIES SOLID OXIDE LABELED RADIOACTIVE WHITE I YELLOW II AND YELLOW III, TRANSPORT INDEX 0.1 FISSILE CLASS I DOT TYPE 3 TRUPACT II USA/9218/B(M)F SEALE #s 462,463	16653		
		In Case of Emergency, Contact U. S. Department of Energy (208) 526-1515			
		DRAFT			

Subject to Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement.

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "To be Prepaid."

COLLECT

Received $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per The signature here acknowledges only the amount prepaid

Charges Advanced

$

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."

NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

Per

EG&G Idaho, Inc. for US DOE Shipper Agent

Per Per

Permanent address of shipper P.O. Box 1625 Idaho Falls, Idaho 83415

There are several system enhancements including extra training, stricter driver qualifications, etc., that must be observed by the trucking contractor. These extra precautions taken by the drivers should keep the WIPP shipments below the national average for radioactive materials, hazardous materials and interstate vehicle accidents.

A CONTRACT CARRIER WILL BE USED TO ENHANCE SAFETY REQUIREMENTS

- **Emergency response plan**
- **Equipment maintenance plan**
- **Insured**
- **Eight-hour replacement capability of tractor**
- **While in transit:**
  - **Two drivers available**
  - **Shipment under constant surveillance**
  - **Periodic contact with CMR**

The eight-hour replacement capability requirement has been successfully demonstrated during preoperational dry-runs and TRANSAX '90.

DRIVER QUALIFICATIONS

- Meet DOT requirements (49 CFR Parts 177.825 and 391)
- Minimum of 25 years of age
- 100,000 miles semitractor-trailer experience
- Two years uninterrupted semitractor experience in last five years
- Receive DOE and contractor training
- Annual physical
- Drug testing
- Peer review program
- CVSA vehicle inspector certified

493R:6077g

Placarding is based on labeling, which is based on radiation level and/or curie content. A placard is required if one or more packages are labeled Yellow III (i.e. The surface dose rate is greater than 50 mrem/hr or the transport index is equal to or greater than 1).

The standard placard for radioactive material is yellow on top, white on the bottom, with black lettering and a black radiation symbol in the yellow portion. In the bottom corner is the United Nations number "7," denoting radioactive materials.

NOTE: See 49 CFR, Part 172, Subpart F - "Placarding," for information on all placard information. 49 CFR 172.556 contains all information or "Radioactive" placards.

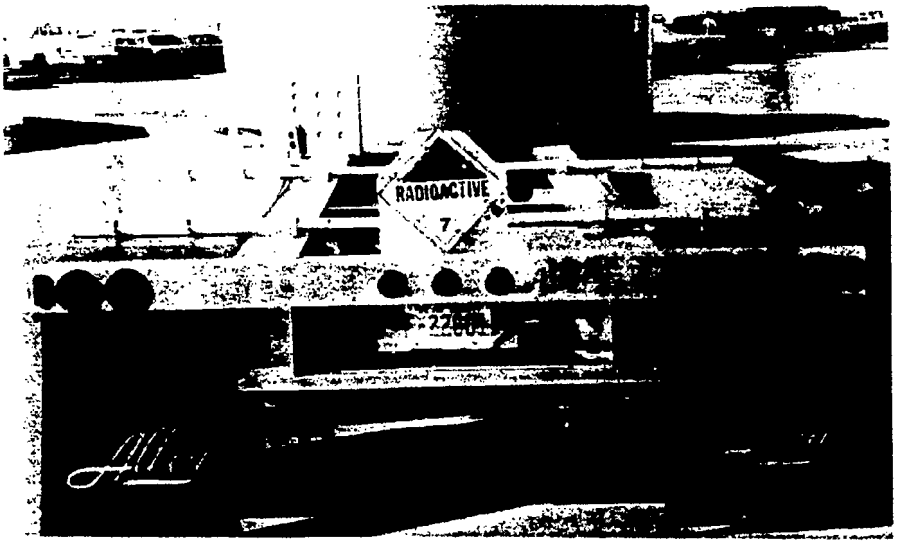
The standard radioactive placard, placed on a white background with a black border, denotes that the shipment is a Highway Route Controlled Quantity (HRCQ). The determination of whether to use a standard placard or a Highway Route Controlled Quantity placard is based on curie content and isotope.

49 CFR 173.403 defines "Highway Route Controlled Quantity" as meaning, "a quantity within a single package which exceeds:

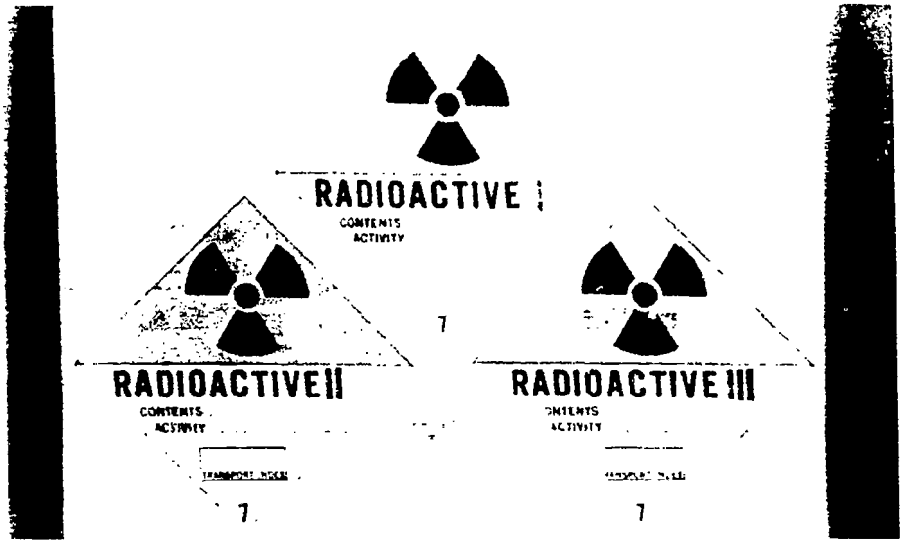
(1) 3000 times the A_1 value of the radionuclides as specified in section 173.433 for special form radioactive material;

(2) 3000 times the A_2 value of the radionuclides as specified in section 173.433 for normal form radioactive material; or

(3) 30,000 curies, whichever is less."



49 CFR 172.504 states that placards must be in plain view and displayed on the rear of the transport vehicle, each side of the transport vehicle, and on the front of the transport vehicle or trailer.



Labels are placed on packages. 49 CFR 172.406 (e) states that packages must have labels placed "on two sides (other than the bottom) of each non-bulk package containing a radioactive material."

The contact-handled TRUPACT-II is an example of a package, as are the standard waste boxes and drums.

If the curie content and isotope indicate a "Radioactive I" label, it will be all white with the curie or activity content listed and the isotope. A "Radioactive II, and III" label is yellow on top and white on the bottom with the same information.

Radioactive Yellow II and III labels will also tell the first responder the exposure rate at one meter. This information is also known as the "Transport Index." Labels on TRUPACT-IIs may vary depending on the contents of the package. See 49 CFR 172.403 (b).

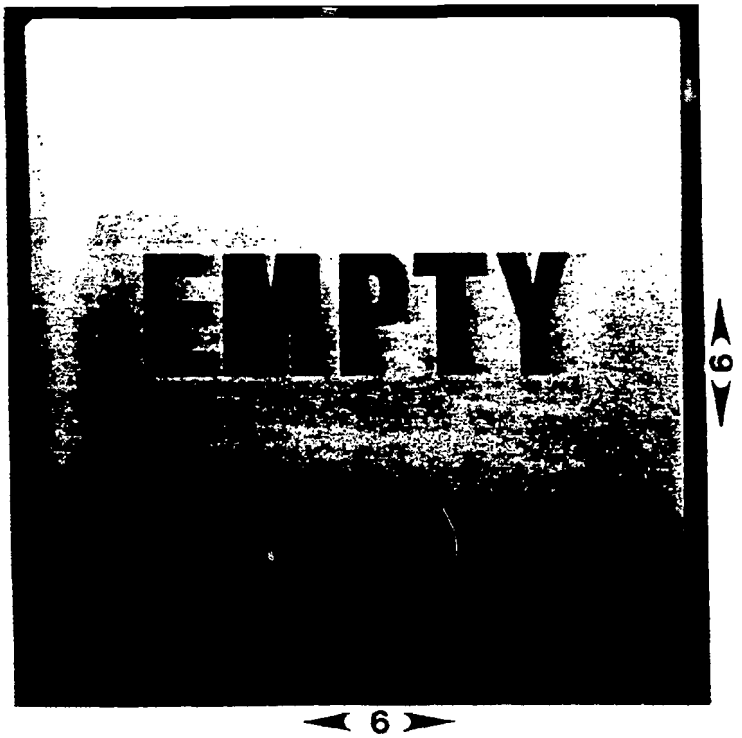
DOT LABELING

	Max mrem/hr Surface	Max mrem/hr at 1 meter or appr. 3 feet from package surface (Transport Index)
• Radioactive White I	.5	N.A.
• Radioactive Yellow II	50	1
• Radioactive Yellow III	200	10

The transport index is a good indicator for determining the external radiation hazard of an undamaged package and a good starting point for determining whether damage has occurred.

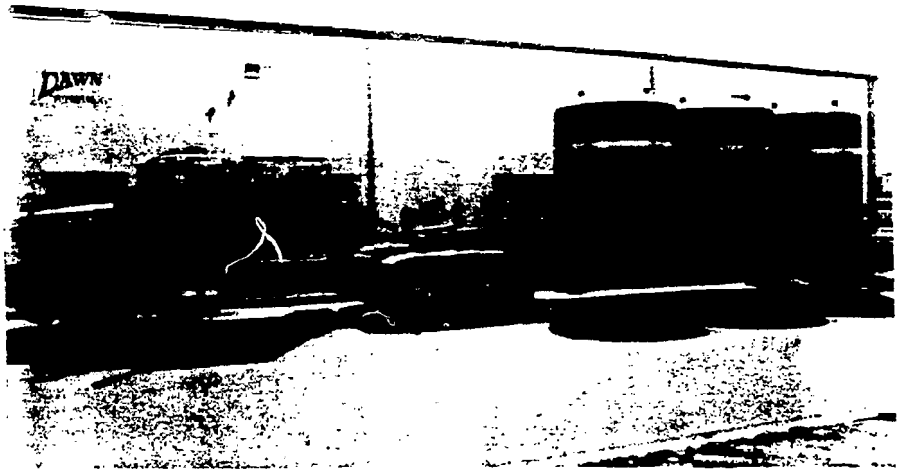
Transport index is defined as the dimensionless number (rounded up to the first decimal place) placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index is determined by the number expressing the maximum radiation level in millirem per hour (mrem/hr) at one meter (3.3 feet) from the external surface of the package.[1]

[1]49 CFR 173.403, Subpart I - Radioactive Materials; (bb)



Fifty percent of all shipments will have an "EMPTY" label placed on the TRUPACT-II. This will be done when the TRUPACT-II is being shipped to a generator site. Empty TRUPACT-IIs may be shipped to the WIPP or other sites. Even though the TRUPACT-II will have no radioactive materials, it may contain loading pallets or empty drums for use at the generator site.

See 49 CFR 172.403 (d) and 49 CFR 173.427 (d) for further information on the use of the "EMPTY" label. See 49 CFR 172.203 (e) on what may be contained in "empty" containers



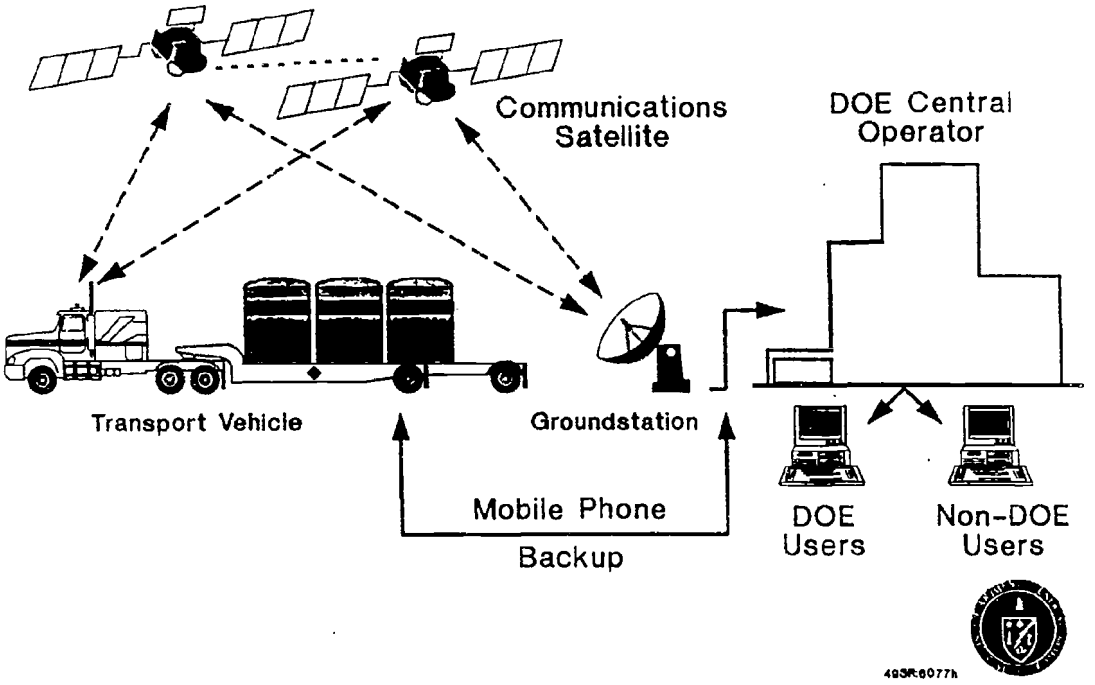
The physical size and weight of the TRUPACT-II transporter must conform to all U.S. Department of Transportation regulations for any 18-wheel vehicle.

The trailer shown in the illustration is the "spread axle" design. There are no plans to use any other trailer. This trailer offers better stability and improved axle loading capability.

All tractors carry instrumentation capable of detecting alpha, beta, and gamma radiation. The instruments are located under the bunk portion of the cab. Properly trained first responders may use them if necessary.

Drivers are trained to use this instrumentation to perform "Go/No-Go" checks on the vehicle and the TRUPACT-IIs. In an emergency, the driver, if able, will provide readings to the Incident Commander at the incident scene.

TRACKING SYSTEM



The WIPP shipment will be enhanced by the use of a satellite tracking system called TRANSCOM (Transportation Tracking and Communication System). TRANSCOM combines dual satellite tracking, telecommunications, and computer network technologies to monitor the movements of DOE shipments in near real time. As a responder, this system can be of value to you in locating loaded and empty transporters. It can track a vehicle 24 hours a day, seven days a week.

Your state has been provided access to the system by use of a compatible computer, modem, software and training provided by the Department of Energy, free of charge.

Information available from TRANSCOM includes:

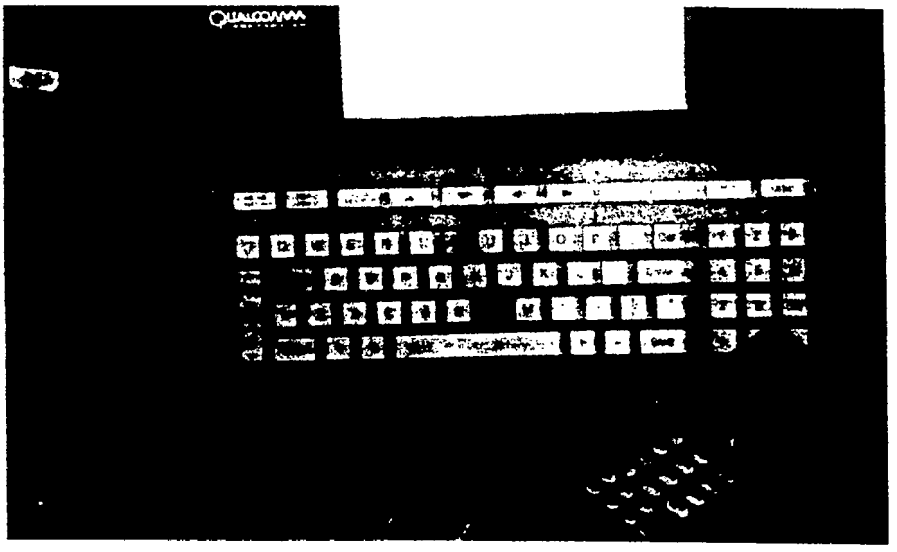
Shipping paper data

Emergency notification telephone numbers

Emergency checklists (as found in the Emergency Response Guidebook)

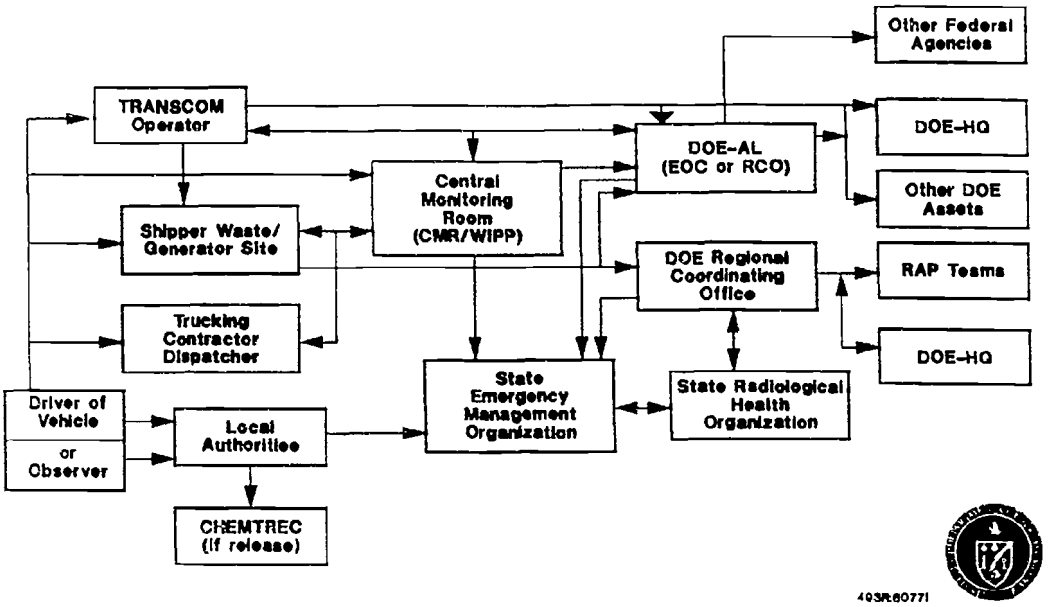
Truck location

Advance shipping schedule



Each vehicle's telephone is used to check in with the Central Monitoring Room every 100 miles or two hours and when crossing state borders in the event the tracking system fails. It may also be used to summon emergency response. If needed, this telephone may be used by first responders.

TYPICAL NOTIFICATIONS AFTER A TRUPACT-II ACCIDENT



Typically, the local authorities are the first to be notified of a hazardous materials accident. However, with the WIPP's tracking and communication system, notification to several entities may be made simultaneously.

The notification chain has a certain amount of redundancy in cross-flow of information, especially between the state and DOE.

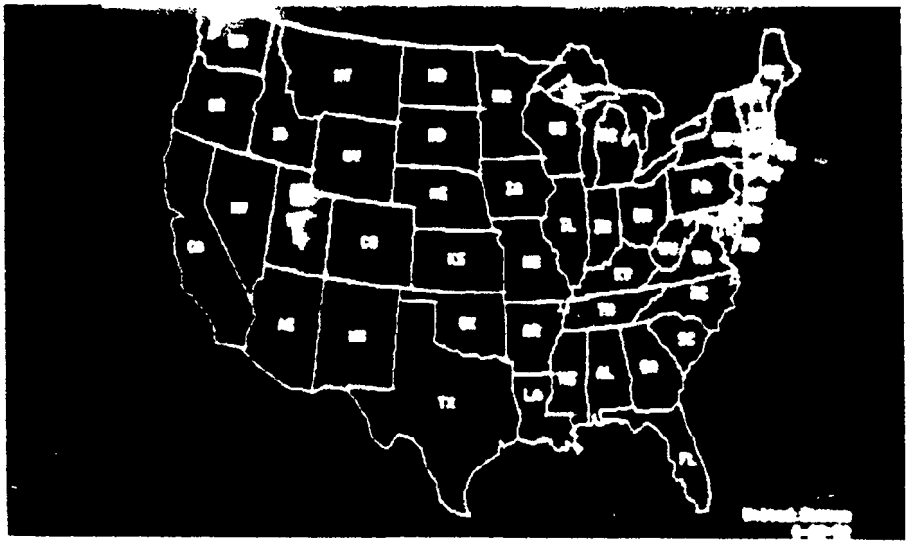
Usually notification of an incident begins with a local person calling the nearest law enforcement office or emergency center, reporting that an accident or problem exists. This person may be at the "First Responder - Awareness" level, as defined by 29 CFR 1910.120, or higher. These trained professionals have the expertise to identify hazards and make notifications on a hazardous material spill. However, in the case of a WIPP transporter, initial notification can be accomplished in a variety of ways.

Notifications may include the State Hazardous Material Office, the National Response Center (1-800-424-8802), CHEMTREC (1-800-424-9300), the local law enforcement agency (911), or others as outlined in the state emergency response plan.

General information that may be needed includes:

- Name/agency of the person reporting the incident
- Location of the hazardous material incident
- Type of hazardous material involved
- Nature of the problem
- Quantity released, if known
- Potential hazards
- Other information when the product has been identified
- Health risks associated with the spill and medical attention needed
- Precautions taken
- Number and type of injuries, if any

Hazardous Materials for First Responders, International Fire Service Training Association (IFSTA), Page 7, April 1990.



The TRANSCOM national map on the computer screen in the Central Monitoring Room and at Oak Ridge, Tennessee, along with other non-Department of Energy users, will have all shipping information on it. Each vehicle will be located by an icon. These icons are the identifying markers of the transporter shipments and are color coded for clarity.

A green icon indicates that a shipment is going as planned.

A yellow icon indicates that a shipment has left its assigned route or is not moving.

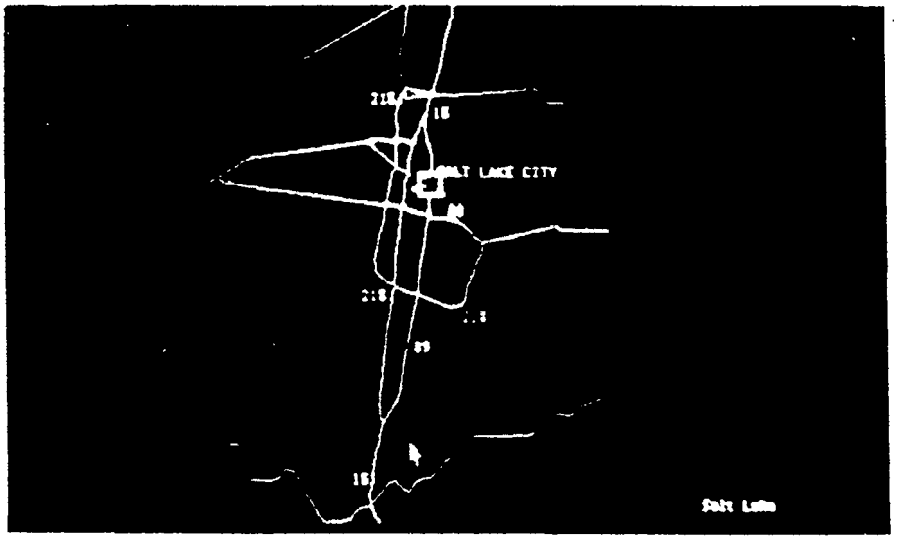
A magenta icon indicates that a problem has developed, such as a flat tire or overheated engine.

A red icon indicates that the shipment has an emergency, such as an engine fire or traffic accident.

A solid color icon indicates a loaded shipment.

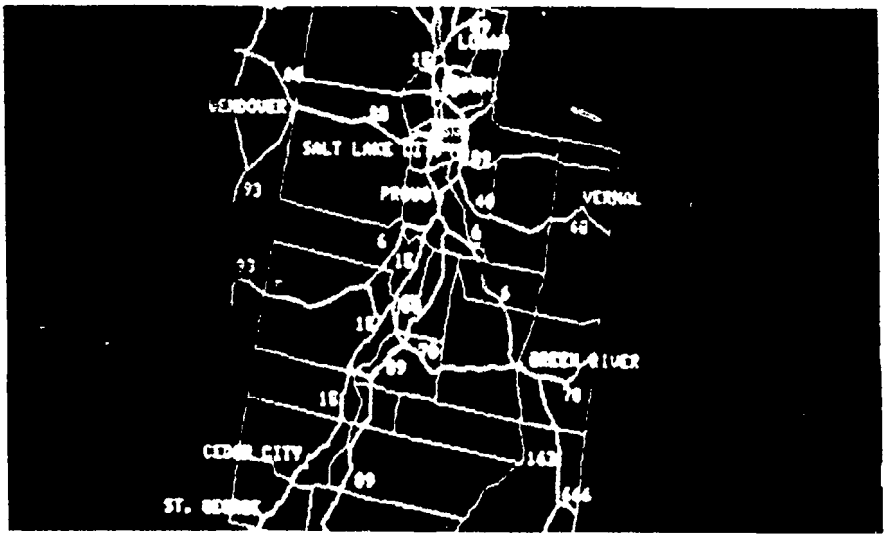
An outlined icon indicates an empty transporter.

This national map is not available on the tractor's keyboard.



If the national map is too cluttered, anyone with access to the TRANSCOM system can view a specific state where the shipment being tracked is located. This enhanced view allows the operator to follow the shipment with less distraction.

The TRANSCOM system can locate a transporter within a single county/parish, accurately pinpointing a shipment within 1000 feet.



Section 5
PACKAGE DESIGN

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Recognize the TRUPACT-II

2) Describe how a TRUPACT-II is secured to the transporter trailer

3) State the number of drums or standard waste boxes per TRUPACT-II

There are two basic types of packaging for radioactive materials: Type A and Type B. The latter is the type that the NRC requires for the transport of the type of waste that will be sent to the WIPP. Type A packages must withstand normal conditions of transport without loss or dispersal of their radioactive contents as demonstrated through tests outlined in regulations issued by the Department of Transportation (49 CFR Part 173). Type B packaging must withstand both normal and accident transport conditions without releasing its radioactive contents. In order to transport TRU waste containing more than twenty curies of plutonium per package, the Type B packaging must have double containment.[2]

[2] Final Supplement Environmental Impact Statement; Waste Isolation Pilot Plant; Volume 2; January 1990, pg L-5

TRANSPORTER PACKAGES ARE NUCLEAR REGULATORY COMMISSION CERTIFIED

- **Non-vented/doubly contained**
- **Tested under accident conditions**
- **Legal weight and dimensions**
- **TRUPACT-II for CH waste**

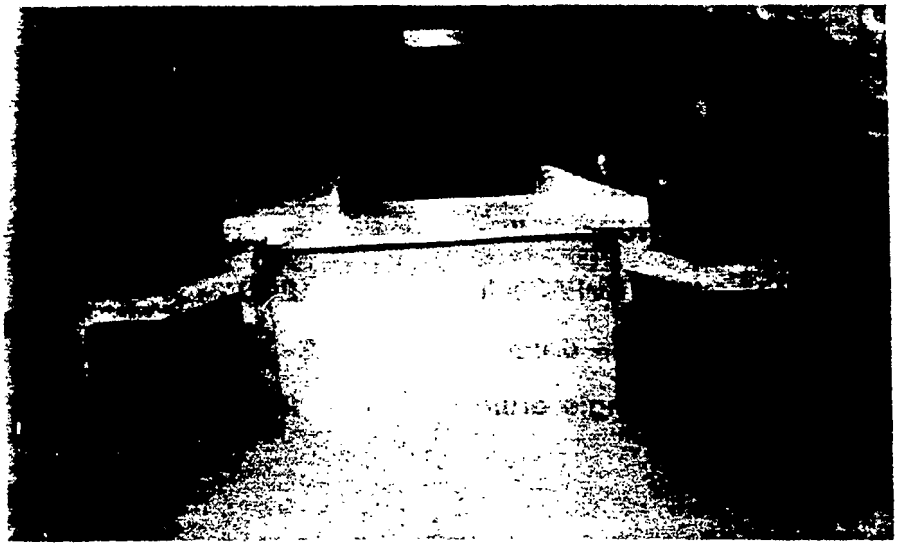
To be certified by the Nuclear Regulatory Commission as a Type B package, the package must be able to demonstrate resistance to the worst conditions that can be expected in a transportation accident. These "hypothetical accident conditions" are outlined in 10 CFR 71.73.

POTENTIAL TRUPACT-II DOSES

	Contact Dose Rate (mrem/hr)
• **Typical TRUPACT-II**	**10**
• **Maximum TRUPACT-II**	**200**
• **Typical single drum**	**3-10**
• **Maximum single drum**	**200**

When you approach a loaded TRUPACT-II with an instrument, you may notice a reading higher than background, even though the TRUPACT-II may not have been damaged in the accident.

At the levels shown in the table above, it is safe for you to proceed with rescue and first aid.



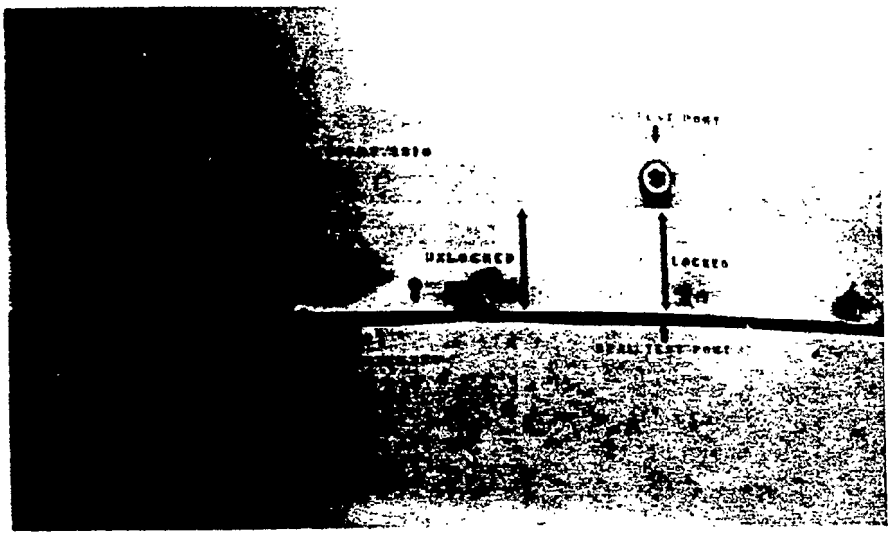
Each TRUPACT-II has four "U"-shaped tiedowns that hold the TRUPACT-II in place on the trailer. The tiedown U-bolts (an integral part of the trailer) are not as strong as the tiedown lugs (an integral part of the TRUPACT-II), but they are not designed to break.

Tiedown lugs, by NRC regulation, which are part of the package must be able to withstand 10 times the weight of the package in the forward direction, 5 times in the lateral direction, and 2 times in the vertical direction. The aggregate total of the tiedowns must be able to withstand one and one-half times the weight of the package.

As a first responder, you should check these tiedowns at the scene to ensure they are still intact. If the tiedown is obviously broken, deformed, or missing, keep all personnel clear of the TRUPACT-II. This is to prevent injury in case the TRUPACT-II should fall and roll.

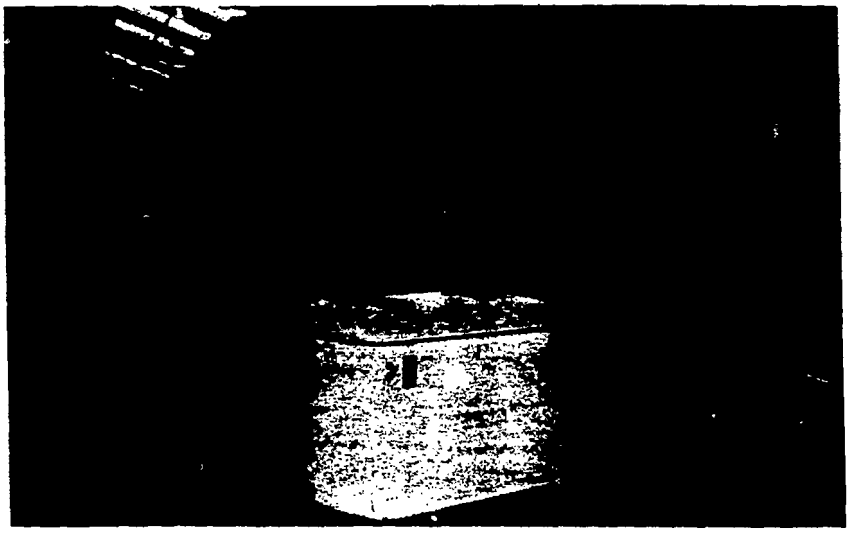
A special hoist is used to lift the TRUPACT-II lids. The lifting lugs are for lifting the lid of the TRUPACT-II only. The lugs will NOT support the weight of the TRUPACT-II.

The lid of the TRUPACT-II has a tongue-and-groove configuration on lid seating surfaces. This lid then rotates much like a home pressure cooker and locks the lid in place.



The locked or unlocked status of the TRUPACT-II lid locking ring is indicated by arrows on the ring and the body of the TRUPACT-II surface.

If the locking ring is deformed in a severe accident, it is designed to prevent the lid from coming off.

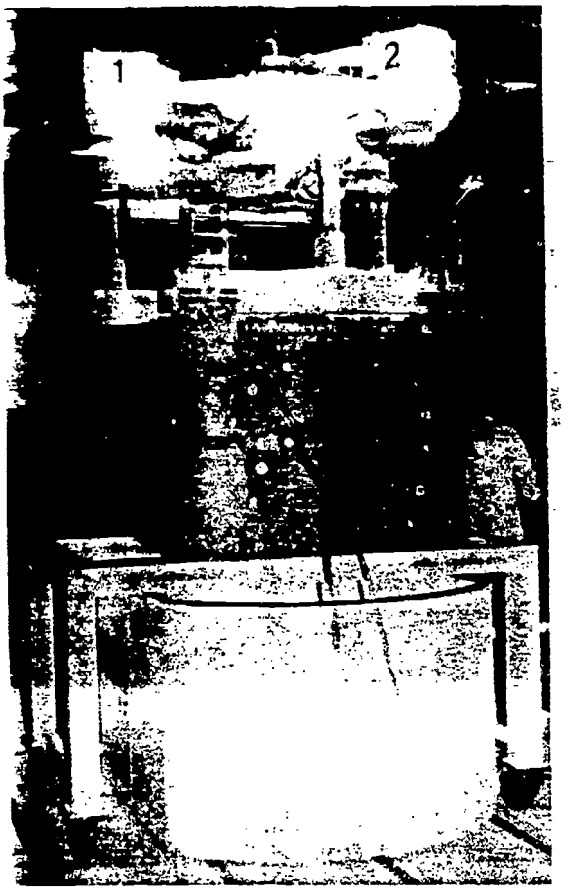


This photo illustrates a Standard Waste Box (SWB). It is designed to package items larger than a 55-gallon drum, mostly large contaminated equipment. It is approximately equivalent to a seven-pack of 55-gallon drums.

The standard waste box will also be used to overpack damaged 55-gallon drums at the generator site. These same containers could be used at the scene of an incident by health physics personnel to overpack damaged drums.

A TRUPACT-II will hold two standard waste boxes.

It is approved by the Nuclear Regulatory Commission as a Type A package.



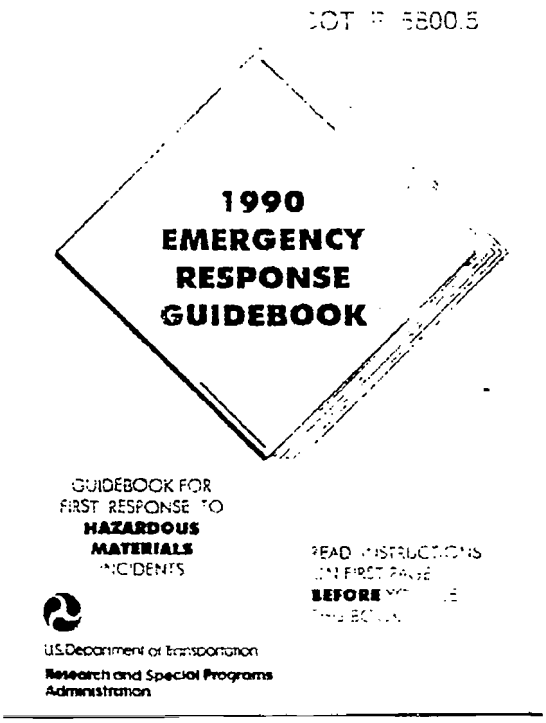
During the Test Phase of the project, we will be transporting containers called test bins. These bins will be inside the standard waste boxes, one test bin per box per TRUPACT-II.

Section 6
EMERGENCY RESPONSE

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) State what guidelines pertain to WIPP shipments



The Department of Transportation's 1990 Emergency Response Guidebook provides guidelines for emergency responders to use for all types of hazardous materials, including radioactive materials.

The guides for radioactive materials are numbered 61 - 66. Guides that are specific to the WIPP are 61 and 63.

Transuranic waste does not have its own specific guide. Therefore, in the blue pages of the Emergency Response Guidebook it should be considered as "Radioactive Material n.o.s. (not otherwise specified)."

Remember that this is only a guidebook and should not take precedence over local standard operating procedures. The Emergency Response Guidebook recommends that CHEMTREC should be called for emergency assistance at 1-800-424-9300. However, for specific information on transuranic waste, it is recommended that the first responder call the State Radiological Safety Office first at _____ and follow their instructions.

Remember, this guidebook is a **guide** only. It can assist you in making decisions, but you should not consider it to be a substitute for your own knowledge, judgement, or experience. This is important because this guidebook has recommendations that are the most likely to apply in the majority of cases and does not represent recommendations that are adequate or applicable in all cases.

The Emergency Response Guidebook is intended to assist those first responders at an incident site to make an informed decision as to the type of hazard involved and what initial precautions to take. In order to effectively use the Emergency Response Guidebook, the first responder should become familiar with it prior to any emergency. It lists the four-digit identification number that is used on certain placards, the

hazardous material name (in alphabetical order), the guide that pertains to the hazard with all the precautions needed to protect the responder from initial harm, and a list of placards commonly found on the vehicles traveling today's highways.

The booklet is divided into six color-coded sections. The first white section contains general guidelines to use in any hazardous material situation. It also addresses the telephone number for CHEMTREC (the Chemical Transportation Emergency Center), the National Response Center, operated by the National Coast Guard, which includes the National Response Team, and a listing of the international classification system used on placards. The initial white section also shows many of the placards used on today's highways. Should the first responder not know what material is represented by the placard, each picture has a specific guide to follow until the hazardous materials involved can be specifically identified.

The next section of the ERG is coded yellow. This section shows the identification number, guide number, and name of the hazardous material. This section of the guidebook utilizes the four-digit number assigned to each individual hazardous material, and the first responder can find the appropriate hazardous material by looking up the number on the placard.

The blue section of the manual alphabetically lists each hazardous material by name, guide number, and identification number for the specific hazard.

The orange section consists of the guides themselves. These guides will show the first responder what precautions to take for specific hazardous materials. The guides list the potential hazards (health, and fire or explosion) and the emergency actions (initial, fire, spill or leak, and first aid).

The green section gives a table of initial isolation actions and protective action distances for certain hazardous materials, only if they are not involved in fire. This section of the ERG does not list radioactive materials, therefore it is not applicable for WIPP shipments.

The last white section gives more general information on first responders' initial actions.

As a first responder at the scene of a hazardous materials incident, seek additional and more specific information about any material in question as soon as possible. This guidebook is not intended for use during the cleanup phase for spilled materials, nor should it be used to determine compliance with any regulations. Be familiar with this guidebook before you actually need to use it in an emergency situation.

For further information on response to other hazardous materials, see the National Fire Protection Association (NFPA) / American National Standards Institute (ANSI) Standards 1500, "Fire Department Occupational Safety and Health Programs"; 471, "Recommended Practice for Responding to Hazardous Materials Incidents"; and 472, "Standard for Professional Competence of Responders to Hazardous Materials Incidents." These other standards will provide guidance for personnel, equipment, and operations at hazardous materials incidents.

GUIDE 61

POTENTIAL HAZARDS

HEALTH HAZARDS

Fire may produce irritating or poisonous gases.
Low level radioactive material: little personal radiation hazard.

FIRE OR EXPLOSION

Some of these materials may burn, but none of them ignites readily.

EMERGENCY ACTION

Keep unnecessary people away.
Isolate hazard area and deny entry.
Self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing will provide limited protection.
Delay clean-up until arrival or instruction of qualified Radiation Authority.
CALL CHEMTREC AT 1-800-424-9300 AS SOON AS POSSIBLE, especially if there is no local hazardous materials team available.

FIRE

Move container from fire area if you can do it without risk.
Small Fires: Dry chemical, CO_2, Halon, water spray or standard foam.
Large Fires: Water spray, fog (flooding amounts).

SPILL OR LEAK

Do not touch damaged containers or spilled material.
Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.

FIRST AID

Use first aid treatment according to the nature of the injury.
Advise medical care personnel that injured persons may be contaminated with radioactive material.

789:3160

If the TRUPACT-II is labeled "EMPTY" or is not damaged, the first responder should use **Guide 61**.

Guide 61 is the least restrictive guide for radioactive materials. It states that response may be performed prior to any radioactive measurements. Use this guide if you are positive there is no release of contents.

As with any hazardous material accident, the first responder should establish an exclusion zone for effective size-up of the incident. Guide 61 states that an exclusion zone should be established and entry denied to unnecessary persons.

As with any radioactive material incident, should a container's contents be exposed or if you are unsure of the condition of the TRUPACT-II, do not touch the containers or any spilled materials. Should you see this type of situation proceed to **Guide 63**.

GUIDE 63

POTENTIAL HAZARDS

HEALTH HAZARDS

External radiation from unshielded radioactive material
Internal radiation from inhalation, ingestion or skin absorption.
Radioactive material: degree of hazard will vary greatly, depending on type and quantity of radioactive material.
Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

Some of these materials may burn, but none of them ignites readily.

EMERGENCY ACTION

Keep unnecessary people at least 150 feet upwind; greater distances may be necessary if advised by qualified Radiation Authority
Isolate hazard area and deny entry.
Enter spill area only to save life; limit entry to shortest possible time
Self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing will provide limited protection for short-term exposure to these materials
Detain uninjured persons and equipment exposed to radioactive material until arrival or instruction of qualified Radiation Authority.
Delay clean-up until arrival or instruction of qualified Radiation Authority.
CALL CHEMTREC AT 1-800-424-9300 FOR EMERGENCY ASSISTANCE. If water pollution occurs, notify the appropriate authorities.

FIRE

Do not move damaged containers; move undamaged containers out of fire zone.
Small Fires: Dry chemical, CO_2, Halon, water spray or standard foam.
Large Fires: Water spray, fog (flooding amounts).
For massive fire in cargo area, use unmanned nose holder or monitor nozzles.
Fight fire from maximum distance. Stay away from ends of tanks

SPILL OR LEAK

Do not touch damaged containers or spilled material.
Damage to outer container may not affect primary inner container
Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.
Large Spills: Dike far ahead of liquid spill for later disposal

FIRST AID

Call emergency medical care.
If not affecting injury, remove and isolate contaminated clothing and shoes; wrap victim in blanket before transporting
If not injured, remove and isolate contaminated clothing and shoes; shower victim with soap and water
Except for the injured, detain persons and equipment exposed to radioactive material until arrival or instruction of Radiation Authority
Advise medical care personnel that injured persons may be contaminated with radioactive material

789:3160

Guide 63 is the most applicable guide to use in case of a WIPP incident. If you are not sure of the condition of the TRUPACT-II, you should use this guide.

When applying this to the worst-case contact-handled accident, this guide is very conservative and is aimed at reducing the external exposure of the first responder to as low as reasonably achievable (ALARA).

The 150-foot exclusion zone mentioned in the guide is adequate for all WIPP shipments. Keep all unnecessary people away from the scene; greater distances may be necessary for people downwind or if advised to do so by a radiation authority.

Response actions may be performed prior to any measurement of radiation; limit your entry to the shortest possible time. (See Emergency Response Guidebook, Guide 63.) Positive pressure breathing apparatus and structural fire fighters response clothing will provide limited protection. Notify a radiation authority as soon as possible of accident conditions.

Detain uninjured persons, isolate equipment with suspected contamination, and delay clean up until you have received instruction from a radiation authority.

Note that materials in special form or Type B containers are not expected to cause contamination in accidents.

Be aware that accident forces must be extremely great to breach a TRUPACT-II. In order for contamination to occur, there must be penetration through the outer skin, the foam, the outer container, the inner container, and then the Type A package inside the TRUPACT-II.

There could be an external radiation hazard from unshielded radioactive materials, and internal contamination may occur through inhalation, ingestion or absorption through the skin.

Section 7
FIRST RESPONDER ACTIONS

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Know what a hazardous material is

2) Know the three zones used at a hazardous materials incident scene

3) Know the rescue responsibilities for WIPP shipments

4) State who has responsibility for decontamination of the incident scene

5) State the duties of the law enforcement, fire fighter, and medical personnel at the scene of a WIPP transportation incident

TYPES OF HAZARDOUS MATERIALS

A hazardous material as defined by the Department of Transportation as "a substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated."[3] It can be further defined by the International Fire Service Training Association as "one that poses an unreasonable risk to the health and safety of operating or emergency personnel, the public, and/or the environment if it is not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal or transportation."[4] These are only two of many definitions in use to describe "hazardous materials."

Radioactive material is defined as "any material, or combination of materials, that spontaneously gives off ionizing radiation. It has a specific activity greater than 0.002 microcuries per gram."[5]

Hazardous materials under normal conditions may produce health, flammability, reactivity, radioactivity, and/or biochemical hazards beyond normal combustible or non-combustible materials.

INCIDENT SCENE BASIC REQUIREMENTS

In order for first responders to effectively carry out their duties, protection and safety of the first responder must be foremost. A safety officer must be appointed at any hazardous materials incident when the Incident Command System is initiated.[6] This includes any WIPP incident. It is the duty of the Safety Officer to implement a safety plan for the incident. The Safety Officer also needs to inform the Incident Commander with recommendations on the establishment of the control zones at the emergency incident, based on the identification and evaluation of the hazard.

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[3] Code of Federal Regulations, Title 49, Transportation, Parts 100-177; Section 171.8

[4] Hazardous Materials for First Responders; International Fire Service Training Association, Fire Protection Publications; Oklahoma State University; April 1990, pp. 7

[5] Code of Federal Regulations, Title 49, Transportation, Parts 100-177; Section 173.403

[6] See 29 CFR 1910.120, paragraph (q)(3)(viii) and NFPA 471, section 4-3

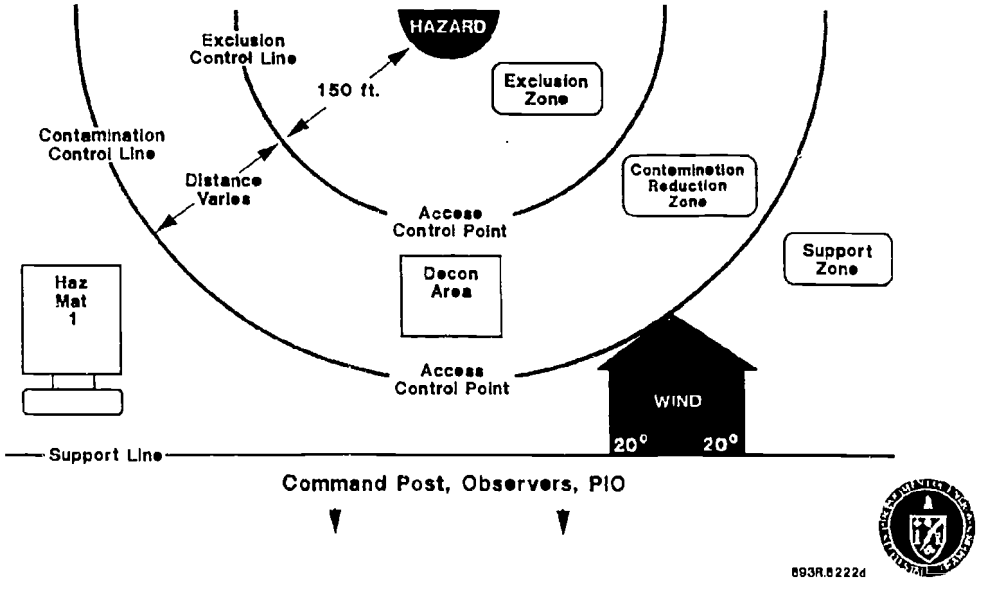
CONTROLLING THE SCENE

The initial Incident Commander must establish a perimeter around the hazard area. This perimeter should be identified to include the hazard area itself (known as the exclusion zone), the contamination reduction zone, and the support zone of the area. The Emergency Response Guidebook lists initial exclusion zone distances. These distances may need to be revised as the incident progresses or conditions change.

Next, the contamination reduction zone should be defined so as to reduce the chance of product spread by personal contamination. This area contains the decontamination station.

The innermost zone to be established is the exclusion zone which will include the hazard area. This is the area of highest hazard, both known and/or suspected. It is suspected that anyone entering this area will be contaminated. Therefore, entry should only be made into this area by those workers who have a need to be in the area for rescue, fire fighting, or the like. Entry into this area must be restricted until the situation proves that this precaution is no longer necessary.

CONTROL ZONE LAYOUT



RESCUE RESPONSIBILITIES

For any WIPP shipment incident, rescue should not be withheld due to the presence of radioactive materials. Personal protective equipment and self-contained breathing apparatus provide excellent protection against alpha and beta radiation from a WIPP shipment. Victim carries and extrication procedures should be implemented and the victim(s) moved to the edge of the exclusion zone for stabilization. Should some other type of hazardous materials be involved in the incident, consult the Emergency Response Guidebook for the precautions to take with that hazard. **Use the most stringent guide for the proper precautions to take at the incident.**

Gloves are a must for the rescuer. Butyl rubber, neoprene, or surgeon's rubber gloves provide excellent protection from contamination for the rescuer and should be worn. A "double glove" technique, where one glove is worn inside another, will help with the transfer of a potentially contaminated victim from the exclusion zone to the contamination reduction zone.

If contamination is suspected or confirmed, rescuers should be surveyed and if found to be contaminated they should be decontaminated using accepted protocols. Basic first aid to keep an airway open, assist with breathing problems and control bleeding should be accomplished if necessary utilizing the most expedient methods to correct the situation inside the exclusion zone. **Rescuers** should **NOT** perform medical stabilization unless absolutely necessary inside the exclusion zone. This should be accomplished by arriving medical personnel so as to prevent/limit the spread of any contamination at the contamination reduction zone. If this is not possible, rescuers should remove their outermost gloves prior to performing any medical stabilization at the exclusion zone so as to prevent the spread of contamination into any wounds.

EXTERNAL RADIATION PROTECTION FACTORS

- **Time**
- **Distance**
- **Shielding**

593R:6116p

The three most effective actions that you can take at the accident scene to protect yourself are:

Limit your TIME of exposure

Keep your DISTANCE

And, if necessary, provide SHIELDING

Shielding is not necessary for alpha radiation and typically not a consideration for beta radiation. Shielding for gamma radiation is not practical in most cases due to the size, weight, and density of the shielding material required.

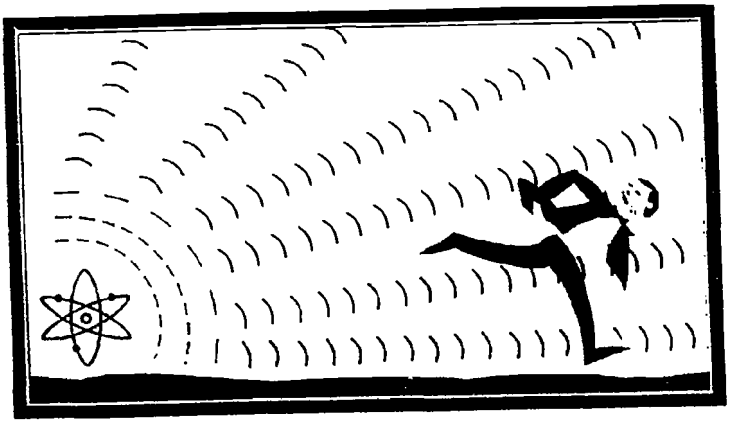
To reduce or eliminate external radiation exposure, use the time, distance, and shielding principles. If you suspect that you are contaminated, stay at the external boundary of the exclusion zone at the decontamination area and wait for qualified radiation monitoring personnel. This will reduce the spread of contamination and lessen potential decontamination efforts.

To reduce or eliminate skin contamination, be prepared to remove your clothing and wash those skin surfaces that are contaminated with soap and water. To prevent internal contamination, use a respirator, if available, and do not eat, drink, or smoke at the accident scene.

If inhalation or ingestion has occurred at the scene, there is no practical way to detect it; and the patient must be evaluated and treated at a medical facility.

TIME

DO NOT SPEND MORE TIME THAN NECESSARY NEAR THE SOURCE

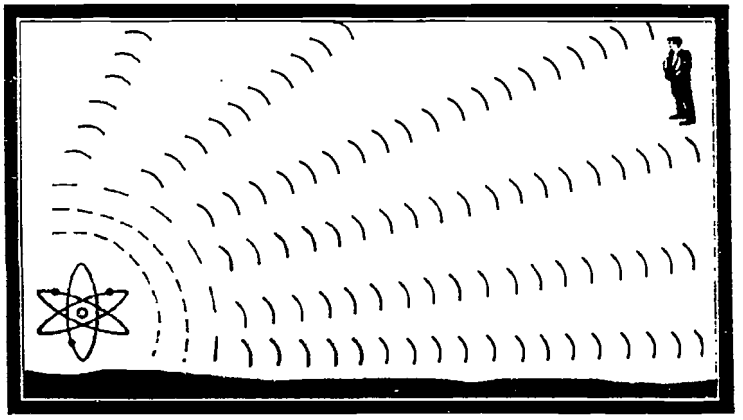


Less time spent near source – less radiation received

Limit your time in the hazard zone to as low as reasonably achievable (ALARA).

DISTANCE

STAY AS FAR AWAY FROM THE SOURCE AS YOU CAN



Greater distance from source – less radiation received

593R8116/

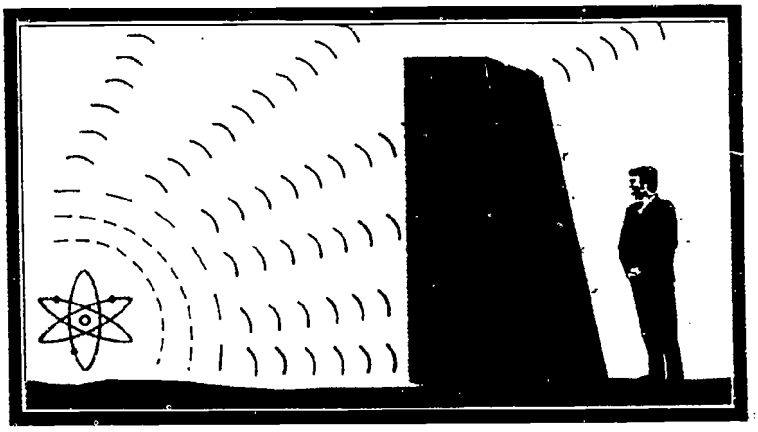
An exclusion zone distance of 150 feet from a WIPP shipment would provide adequate protection under normal conditions unless otherwise directed by a radiation authority or the incident commander; based on guidance contained in the Department of Transportation Emergency Response Guidebook (ERG).

Should a fire be present, this exclusion zone may need to be lengthened on the downwind side of the plume. Should smoke be visible, you should consider that the radioactive materials are within the smoke and extend the exclusion zone to the appropriate distance as requested by the incident commander.

It should be remembered that when the distance from a radiation source is doubled, the intensity is decreased by a factor of four.

SHIELDING

PLACE MATERIAL BETWEEN YOURSELF AND THE SOURCE

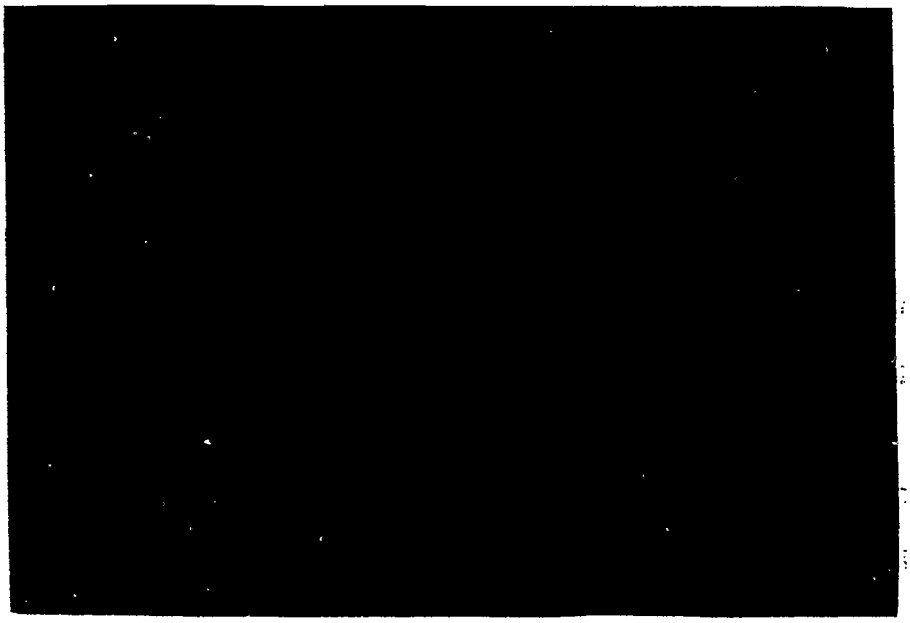


Behind shielding from source – less radiation received

503R81168

Shielding for a contact-handled waste shipment is not necessary.

You should use any type of dense material for shielding. This may include fire vehicles, water trucks, ambulances, buildings, or the like.



The above methods will prevent or reduce inhalation of particulate radioactive material.

Face masks, such as the ones shown in the figure above, will prevent or reduce inhalation of particulate radioactive materials. Full face masks such as those used with self-contained breathing apparatus (SCBA) will protect the wearer from both alpha and beta radiation. Those masks without a face shield will provide protection from the inhalation of radioactive materials but should be used in conjunction with some type of eye protection to prevent the absorption of particulates through the wearer's tear ducts.

LAW ENFORCEMENT ACTIVITIES

___ **Control and secure the scene**

___ **Rescue and emergency care of any victims**

___ **Notification of proper agencies (dispatcher, radiological response teams, fire department, medical personnel, etc.)**

___ **Staging Additional Units**

___ **Isolate the hazard area**

Outside Agencies

___ **Police/Traffic control**

___ **Medical Personnel**

___ **Radiological Assistance Teams**

___ **Public Information Support**

Assess the incident and request appropriate resources. Determine the need for protective actions (e.g., evacuation or sheltering-in-place). If evacuation is determined, proceed as outlined in the local standard operating procedures.

Identify the product and product characteristics if it can be done safely (i.e., at a safe distance).

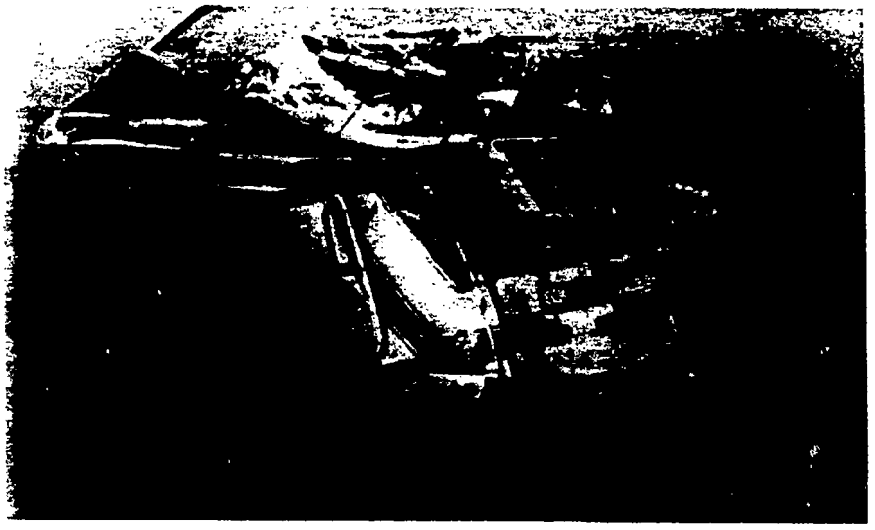
Keep all unnecessary personnel from the scene.

Approach from upwind. Maintain an exclusion zone of 150 feet. Be prepared to expand the exclusion zone if necessary.

Detain all personnel/witnesses entering or leaving the exclusion zone until they are surveyed.

Leave your vehicle outside the exclusion zone until it is determined that no contamination/danger is reported.

Follow all local standard operating procedures. Coordinate activities with the Local Emergency Planning Committee, the State Emergency Response Committee, and other community responders.



Should a placard be obscured or missing, the first responder should try to obtain any information listed on the door of the cab of the tractor. This includes name of the trucking company, numbers, or any other information listed. This will help responding agencies begin a search for shipping information that could be provided by the carrier.

Be conservative when approaching any tractor-trailer accident or any other vehicle involved. Use appropriate caution and understand the potential hazard. You must remain alert to the possibility of hazards or circumstances not addressed in the procedures for all hazardous materials. In other vehicles involved in the accident, hazardous materials may be present in quantities that do not require placards according to regulations. Shipping documents and package labels will always indicate the presence of hazardous materials in quantities of concern. Response strategies may change depending on the type, quantity, and involvement of any hazardous material involved.

FIRE FIGHTING ACTIVITIES

Standard Operations

___ Secure Area

___ Establishment of Exclusion, Contamination Reduction, and Support Zones

___ Size-Up report

___ Additional Alarms

___ Command Post Locations

___ Staging Locations

___ Public Information Officer

___ Safety Officer

Rescue

___ Primary Search

___ Secondary Search

___ Patients turned over to medical personnel

Minimize your time of exposure.

Provide adequate shielding.

Maintain distance from the source.

The use of structural turnout clothing or aluminized turnouts and self-contained breathing apparatus provide excellent protection from WIPP alpha and beta radiation sources.

Shielding alone will NOT provide adequate protection from a gamma radiation source.

Distance is necessary for reducing exposure to gamma rays. Maintaining distance between any radiation source and the fire fighter reduces the chance for radiation injury. This is especially true for gamma sources.

The less time spent in a exclusion zone, the lower the total dose. Records **MUST** be kept of the length of time in the exclusion zone. Record keeping is the responsibility of all responding agencies.

Always approach from upwind; stay back at least 150 feet, except when monitoring, providing first aid, etc.; and consult the Emergency Response Guidebook directions.

All personnel should utilize full structural protective clothing, gloves, hoods, helmets, and self-contained breathing apparatus.

An outer limit "support zone" should be established.

An "exclusion zone" should be established at 150 feet. Be prepared to expand this zone on the downwind side if necessary. (See Note below.)

A "contamination reduction zone" should be established between the "exclusion zone" and the "support zone".

Always work in pairs.

Determine if there is a breach of containers.

Attempt to identify the materials involved. Obtain the shipping papers if possible.

Nothing should be removed from the exclusion zone except for victims. This could spread contamination. **ANY** equipment that is taken into the radiation area, including self-contained breathing apparatus, hoses, rescue, tools, etc., must be left in the outer edge of the limited access zone at a designated location.

NOTE: Access into the exclusion zone is to be limited to those persons necessary to control the incident. A log is to be maintained at the access control point to record entry and exit times of all personnel in the zone. (NFPA 4-4.1)

Radiological specialists, decontamination personnel, and cleanup personnel must be summoned to the scene. These personnel vary from state to state, see state notification cards for your particular area.

Attempt to contain the spread of the substance, isolate the area, and withdraw to the support zone and leave the situation alone until qualified personnel arrive.

If there is a fire situation, assume that the radiological substance is involved and that the smoke is contaminated. Remove all people downwind. Use as little water as possible and contain all run-off water (dike).

DO NOT reenter the area with personnel, except for controlling flare-ups.

All personnel who enter the exclusion zone must be surveyed, and if contaminated, decontaminated by properly trained personnel.

PRE-HOSPITAL EMERGENCY MEDICAL ACTIVITIES

___ Scene Assessment

___ Vehicle Positioning

___ Additional Assistance

___ Personal Protective Equipment

___ Prehospital Notification

___ Triage Area, Set-up

___ Treatment Area

___ Assignment of Personnel

- ___ Triage Area
- ___ Treatment Area
- ___ Logistics Unit
- ___ Operations Unit
- ___ Staging

___ Victims, Number, Type of Injuries

___ Initial Patient Transfer from Exclusion Zone

___ Patient Assignment to Ambulances

- ___ Radiation Contaminated Patients FIRST
  - ___ Contaminated Patients separated from all others
  - ___ Transported to Medical Facility First
- ___ Highest Priority
  - ___ Need Immediate Attention and Transport to a Medical Center
- ___ Intermediate Priority
  - --- Treatment and transport can be delayed for awhile
- ___ Low Priority
  - ___ Walking Wounded
  - ___ Dead

___ Transportation to Medical Facility

Do not delay medical treatment because there is a radioactive placard on the WIPP vehicle.

Base treatment on injury. No special treatment of the injury is necessary due to the presence of radioactive materials. This includes any possible contamination.

Approach the site with caution and look for evidence of hazardous materials.

If a radiation hazard is suspected, position personnel, vehicles, and command post at a safe distance (150 feet) upwind of the site.

Put on protective gear and use dosimeters and survey meters if immediately available at the scene. Should protective gear, dosimeters, and survey meters not be immediately available, do not delay medical support to the victim(s).

Notify proper authorities and hospital.

Determine the presence of injured victims.

Assess and treat life-threatening injuries immediately. Do not delay life support if victims cannot be moved or in order to assess contamination status. Perform routine emergency care during extrication procedures.

Move victims away from the radiation hazard area, using proper patient transfer techniques to prevent further injury. Stay within the controlled zone if contamination is suspected.

Expose wounds and cover with sterile dressings.

Victims should be monitored at the control line for possible contamination only after they are medically stable. Radiation levels above background indicate the presence of contamination. Remove the contaminated victim's clothing.

Move the ambulance cot to the clean side of the control line and unfold a clean sheet or blanket over it. Place the victim on the covered cot and package for transport. Do not remove the victim from the backboard if one was used.

Package victims by folding the stretched sheet or blanket over and securing them in the appropriate manner.

Before leaving the controlled area, rescuers should remove protective gear at the control line. If possible, the victim should be transported by personnel who have not entered the controlled area. Ambulance personnel attending the victims should wear gloves and available respiratory protection.

Transport the victims to the hospital emergency department. The hospital should be given additional, appropriate information, and the ambulance crew should ask for any special instructions the hospital may have. Should any contamination be on the vehicle s tires, the amount of contamination would be extremely minute if the vehicle is left i the support zone. SEE: Waste Isolation Pilot Plant, Final Supplemental Environmental Impact Statement, and ERG-46 for further information.

Follow the hospital's radiological protocol upon arrival.

The ambulance and crew should NOT return to regular service until the crew, vehicle, and equipment have undergone monitoring and necessary decontamination by the radiation safety officer.

Personnel should not eat, drink, or smoke at the accident site, in the ambulance, or at the hospital until they have been released by the radiation safety officer.

Section 8
CONTAMINATION CONTROL

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) State the goal of contamination control

2) Explain how to set up a contamination control (decontamination) area

3) List the criteria for a contamination control site

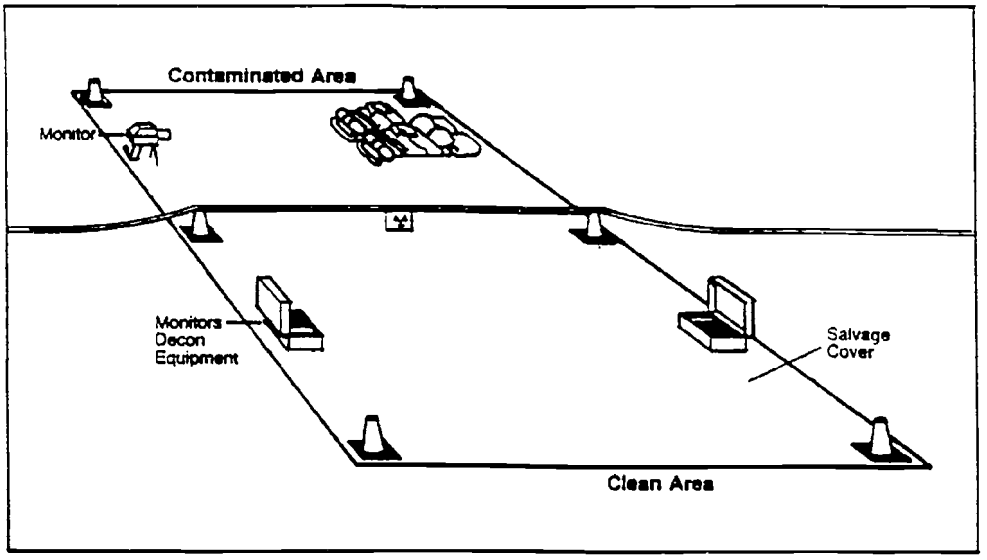
4) List the contamination control procedures

5) Discuss how most patients may be decontaminated

Although the probability of a release of radioactive material from a TRUPACT-II is extremely remote, the emergency responders' concern about potential contamination of themselves or injured persons is valid. Historically, contamination of injured persons at radioactive materials accidents has either been nonexistent or so small as to be undetectable by instrumentation available to first responders.

The goal of contamination control is to prevent the spread of contaminants to objects and individuals. Should any radioactive material leave the exclusion zone, additional personnel, property, and the environment may be in jeopardy of exposure to radiation.

The first step in contamination control (decontamination) is to establish and set up an area where the first responder may step from the exclusion zone to the contamination reduction zone. It is the "exit corridor" from the exclusion zone. The scope of the incident, nature of the hazard, and the number of personnel involved will dictate the size of the area to be designated as the contamination control area.



1. Site selection is determined by the amount and type of decontamination necessary and to what extent the decontamination will be carried out in the field. Several questions must be asked:

    1) Can decontamination be conducted safely?

    2) Are resources available for immediate decontamination of personnel and equipment?

    3) Can the equipment used be decontaminated?

    4) Can the equipment available detect the hazard?

    The ideal decontamination site will be upwind, uphill, and upgrade of the incident and remote from drains, manholes, and waterways to limit the spread of contaminants.

2. This area may be constructed utilizing two salvage covers (tarps) placed overlapping on the ground. Containers such as plastic garbage cans lined with plastic bags are utilized to collect clothing, equipment, or supplies that have been taken into the exclusion zone. One key feature is a rope or barrier tape designating the "dirty" side from the "clean" side.

3. Upon exiting the exclusion zone, responders should remove all outside protective clothing and self-contained breathing apparatus in the contamination control area. All equipment should be contained in a designated collection point.

    Personnel exiting the exclusion area will have to be monitored utilizing the correct radiation detection equipment. This is to reduce the possibility of contamination being brought into the "clean" side of the decontamination control area. Should contamination be found, those areas affected must be washed and re-surveyed.

PRIMARY GUIDELINES FOR CONTAMINATION AVOIDANCE

The primary rule is that emergency response personnel should keep actions which involve approaching or handling radioactive materials, containers, and packages to a minimum. When necessary, use common sense and follow these guidelines:

1) **Assume Contamination Is Present** - If the accident is severe, if packages are visibly damaged, or if there is any doubt whether the radioactive material is still confined, assume that the immediate incident area is radioactively contaminated. Take special care to minimize personal contact with the outer clothing of individuals, the surface of the ground, vegetation, and other things within or that have been removed from the incident area. Use available personal protective clothing and equipment.

2) **Don't Move Materials** - When a transportation incident involves radioactive material and packages are strewn about, do not move vehicles, shipping containers, or wreckage except to rescue people. Detour all pedestrian and vehicular traffic.

3) **Don't Eat, Drink, or Smoke** - In the incident area.

4) **Use Time, Distance, and Shielding Techniques** - To limit exposure and dose rates.

DECONTAMINATION OF INJURED PERSONS

Although the probability of a release of radioactive material from a TRUPACT-II is extremely remote, the emergency responders' concern about potential contamination of themselves or injured persons is valid. Historically, contamination of injured persons at radioactive materials accidents has either been nonexistent or so small as to be undetectable by instrumentation available to first responders.

Field decontamination of injured persons prior to transport to a hospital is not generally recommended. **IF**, because of local protocols, procedures, or instructions of the on-scene commander, you are required to decontaminate injured persons, the procedure below, *which is actually for hospital decontamination*, may be utilized.

You must always weigh the benefit of any field decontamination against the prevailing condition of the patient and the potential of deterioration of that condition while you are decontaminating.

- Removal of clothes and shoes removes most of the contamination.
- Decontamination of injured persons should be accomplished under medical supervision. Do not delay transport of a seriously injured person.
- Irrigate eyes with water or saline only if they are irritated because of smoke or road dust.
- Do not attempt cleansing of mouth or nose of an injured person since aspiration of fluids might occur.
- Cover wounds. Initial bleeding will flush out most of the contaminants. Subsequent flushing of wounds might remove clots that are preventing hemorrhage.
- Cleanse skin by rinsing with water only if weather is warm and the patient's medical condition will not be affected.

NOTE: For additional information concerning Pre-Hospital Emergency Medical Activities, see pages 87 and 88 of this manual or the "Transport of Radioactive Materials Q&A About Incident Response" pamphlet produced by the Oak Ridge Associated Universities. Copies can be obtained by writing FEMA Publications Center, P.O. Box 70274, Washington, D.C. 20024 or calling AC 301-447-1360.

DECONTAMINATION PROCEDURES FOR UNINJURED EMERGENCY RESPONDERS AND MEMBERS OF THE PUBLIC

If decontamination is required for individuals not requiring medical care, local protocols and procedures must be followed. It is recommended that uninjured persons be field decontaminated under the direction of a health physicist, paramedic, or persons trained in personnel decontamination and radiological monitoring as opposed to transporting them to a hospital and overwhelming the resources of the facility.

The following is a partial listing of some of the steps and procedures that may be included in field decontamination operations.

1) **Establish an Entry Point:** Must be clearly marked and allow for one-way flow of personnel.

2) **Primary Decontamination:** This will involve personnel who have entered the exclusion zone, to include not only emergency response personnel but vehicle occupants involved in the accident and members of the public who entered the exclusion zone for any reason. This operation may be as simple as removing the outer layer of clothing. Special care should be taken to not transfer contamination to inner layers of clothing. the clothing removed must be properly containerized (plastic bags used as liners for trash cans has proven very effective for this purpose) and marked for future mitigation actions or disposal.

3) **Monitoring or Survey:** Each person processing through the contamination control line must be monitored or surveyed using the proper radiation detection equipment. Your state or tribe has specialized teams and equipment to assist you in this portion of the decon operation.

4) **Secondary Decontamination:** *Most radioactive contaminants do not readily penetrate intact skin.* Should the survey reveal contamination, the area should be gently washed with warm water and a mild soap. Scrubbing of the area with other than a SOFT brush could abrade the skin and add to the possibility of absorption. Should contamination persist, contact health safety personnel for additional procedures.

5) **Medical Evaluation:** Once personnel have completed decon actions, they should report to the medical unit for evaluation by qualified medical personnel.

6) **Cleanup:** All equipment and clothing items suspected or confirmed contaminated must be sealed in plastic and turned over to the DOE contractor responsible for decontamination.

If you have any final questions, please feel free to ask your instructor or write them down and send them to the WIPP Project Site Office at the address below.

WIPP
External and Governmental Affairs
Westinghouse Electric Corporation
P.O. Box 2078
Carlsbad, New Mexico
88221

Section 9
INCIDENT COMMAND SYSTEM

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

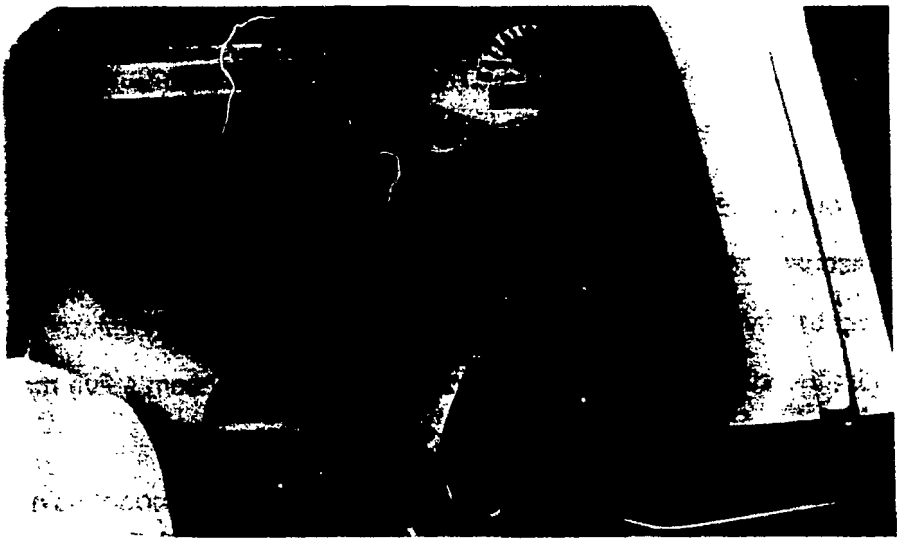
1) Discuss the reasons the Incident Command System was established

2) List the five major functions of the Incident Command System

3) List the subfunctions of the Incident Command System's five major functions

4) Describe the role of the Incident Commander

5) Perform the incident command theory on a tabletop model using scenarios supplied by the course instructors



The Incident Command System (ICS) was developed as a consequence of fires that consumed a large portion of Southern California in the early 1970s. As a result of those fires, a need was identified for a system that would organize all responding agencies in order for work to be directed toward a common goal. This system consists of procedures for controlling personnel, facilities, equipment, and communication for all the agencies involved in a particular emergency incident.

The ICS begins with thorough preplanning for any hazards that may occur within a given jurisdiction. It can adapt to minor as well as major incidents within multiple or single jurisdictions. It can be utilized during mutual aid responses to centralize command; all others supporting that commander through the life of the incident. It also has the flexibility to split the command, should the incident encompass several political jurisdictions. In this instance, though, there may be several agency commanders. The overall responsibility of the incident would be with a single Incident Commander.

The ICS also centralizes communication for all responding agencies, utilizing common terminology and operating procedures. Dedication of radio channels for those directly involved in the emergency simplifies radio problems for all. Agencies not directly involved in the emergency should be assigned alternate channels for their communication needs. This may include the staging area, logistics, finance, or anyone else with a communication need.

The ICS allows for the combining of resources during the emergency. Should the emergency become such that extra personnel and equipment are needed from neighboring jurisdictions, these are easily integrated into the command structure. An incident commander may call for additional aid in anticipation of possible incident enlargement and keep that aid in the staging area.

A hazardous material, as defined by the U.S. Department of Transportation, is one that poses an unreasonable risk to the health and safety of operating or emergency personnel, the public, and/or the environment if it is not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal, or transportation.

A hazardous substance as defined by the U.S. Environmental Protection Agency is any substance designated under the Clean Water Act and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as posing a threat to waterways and the environment when released.

A hazardous waste, as defined by the U.S. Environmental Protection Agency, is discarded materials regulated by the Environmental Protection Agency because of public health and safety concerns. Regulatory authority is granted under the Resource Conservation and Recovery Act.

In 29 CFR 1910.120, OSHA recognizes all these categories as hazardous material.

PRIORITIES AT ACCIDENT SCENE

- **Control accident scene**
- **Save lives**
- **Contain/cover RAM**
- **Assess damage**
- **Call state radiological agency**
- **Call DOE**

Refer to the contact cards given to you at the start of this course for your state or tribe and DOE emergency response numbers.

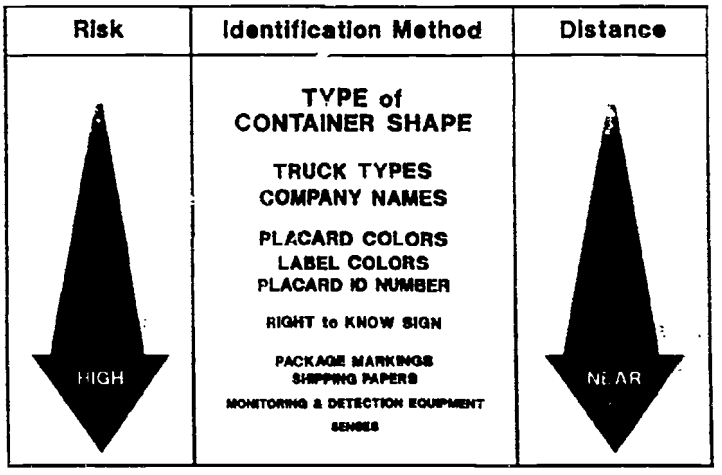
Your point of contact may be determined by legislation or local protocol. Check your state and local emergency response plans to determine which agency is your contact for radioactive materials.

The initial priority at the accident scene is to control the scene, save lives, and contain or prevent the spread of contamination. Medical treatment or emergency extrication should not be delayed because there is a radioactive placard on the vehicle. If other hazardous materials are involved, the first responder must take the necessary precautions for those hazardous materials involved. This may include doing nothing except making the proper notifications.

The Incident Commander must establish an initial exclusion area in order to control the accident scene. In accordance with the Emergency Response Guidebook, this initial exclusion area should be at least 150 feet (Guide 63, for WIPP accidents). Wind, smoke, and other factors may indicate the need to expand this area, especially downwind from the scene. Should the exclusion zone need to be expanded, there are no general rules as to the amount of area that should be contained. Variables such as wind speed and direction will influence this decision. Evacuation should always be kept in mind, whether it be public evacuation or sheltering-in-place. Sheltering-in-place should be considered for those residents occupying facilities that are difficult to evacuate (i.e., nursing homes, hospitals, schools, etc.).

Damage assessment includes: proper identification of the hazard involved, fire suppression activities, injuries, estimate of the amount of release, and any information that would help in the mitigation of the incident. These factors will help the incoming state units and hazardous material cleanup teams, as well as the Department of Energy Radiological Assistance Team, to know the amount of equipment and personnel to bring to the scene. Damage assessment is usually referred to as the initial size-up of the situation and should involve all the critical scene factors that may present a hazard to life, property, or the environment.

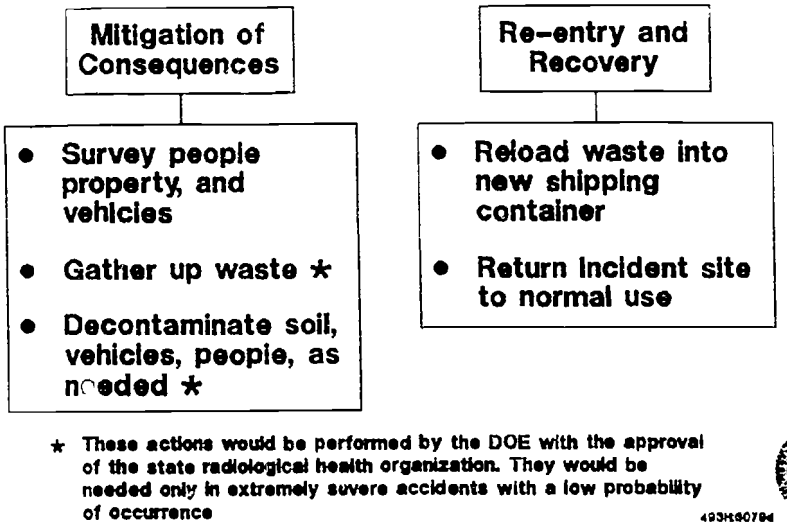
Should any suspected radioactive materials be on the ground, they should be covered with a tarp, plastic, or salvage cover until the proper authorities arrive to clean up the debris. In the case of a WIPP TRUPACT-II incident, a release of nuclear material would be an extremely unlikely event.



The farther away from a hazardous material incident you are, the safer you are. In any hazardous material incident, safety is distance. Recognizing and identifying the material by its container or placard is safer than by shipping papers. Learn as much as you can from as far away as you can.

NOTE: The shipping papers will give you exact information on what you have and identify the quantities. Placards will not do this to the same degree or level.

TRANSPORTATION EMERGENCY RESPONSE

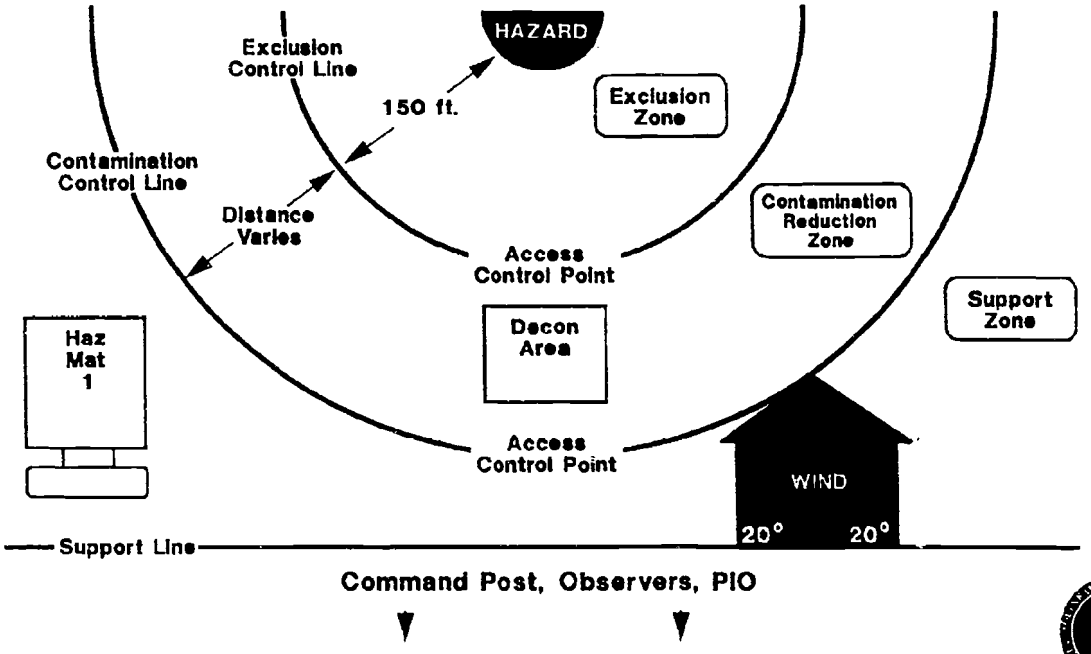


The activities performed by state, tribal, and local authorities in response to a transportation emergency involving TRU wastes can be divided into two parts. The first part includes the initial actions or "primary" actions, and the second part includes "secondary" or follow-on actions. The primary actions include an initial assessment of the situation (size-up), notification, rescue of injured personnel, protection of surrounding property and the environment, and assessing the damage both immediate and possible, if intervening action is not taken.

Primary actions include the assessment for protective action, examination of shipping records to determine the immediate hazard, and establishment the initial exclusion zone of 150 feet minimum around the accident site.

Perimeters should include the "exclusion zone" (also known as the "hot zone" or "red zone"), the "contamination reduction zone" (also known as the "warm zone" or "yellow zone"), and the "support zone" (also known as the "cold zone" or "green zone") where the Incident Commander and Command Post will be. These zones will insure safety, limit the spread of the material, control the hazard area, allow decontamination, and support emergency operations as established by the Incident Commander and the hazardous materials groups/teams.

CONTROL ZONE LAYOUT



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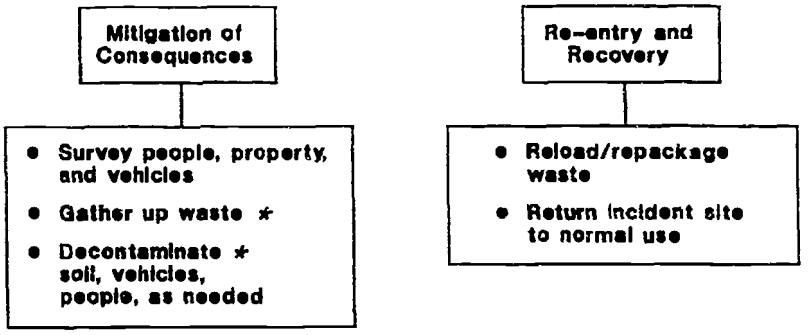
TRANSPORTATION EMERGENCY RESPONSE



* *These actions would be performed by the DOE with the approval of the state radiological health organization. They would be needed only in extremely severe accidents with a low probability of occurrence*

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The activities performed by state/tribal authorities and the DOE in response to a transportation emergency involving TRU wastes traditionally occur after the formal Incident C mmand System has been established. These include, but are not limited to, recovering waste; surveying personnel, property, and equipment; and decontaminating soil, equipment, and personnel. These actions may also include reloading the spilled waste into new containers and returning the site to its normal condition.

SCENE ASSESSMENT

Initial scene evaluation is commonly known in the fire community as "size-up." Size-up is a rapid, yet deliberate, consideration of all critical scene factors. The result of the size-up operation will develop into a rational operational plan which will help mitigate the outcome of the response. Every hazardous material response must begin with a size-up operation in order to determine the hazards involved to response personnel, the public, and the environment.

Identification and Hazard Assessment (IDHA) begins with identifying the material or incident at hand. There are several information sources that will aid the Incident Commander with the initial size-up of the situation and the IDHA. These include but are not limited to:

Material Safety Data Sheets (MSDS) for chemicals
Placards and labels
Shipping papers (bills of lading, way bill, etc.)
Reference guides (Emergency Response Guidebook, etc.)
Technical information centers (CHEMTREC)
Computer data bases

The Incident Commander must at all times think and promote SAFETY. For an Incident Commander to effectively and safely institute operations and mitigation procedures, foremost in his/her mind must be the safety of the personnel involved. In fact, the first operational thought should be safety. The first operational priority is to isolate and deny entry.

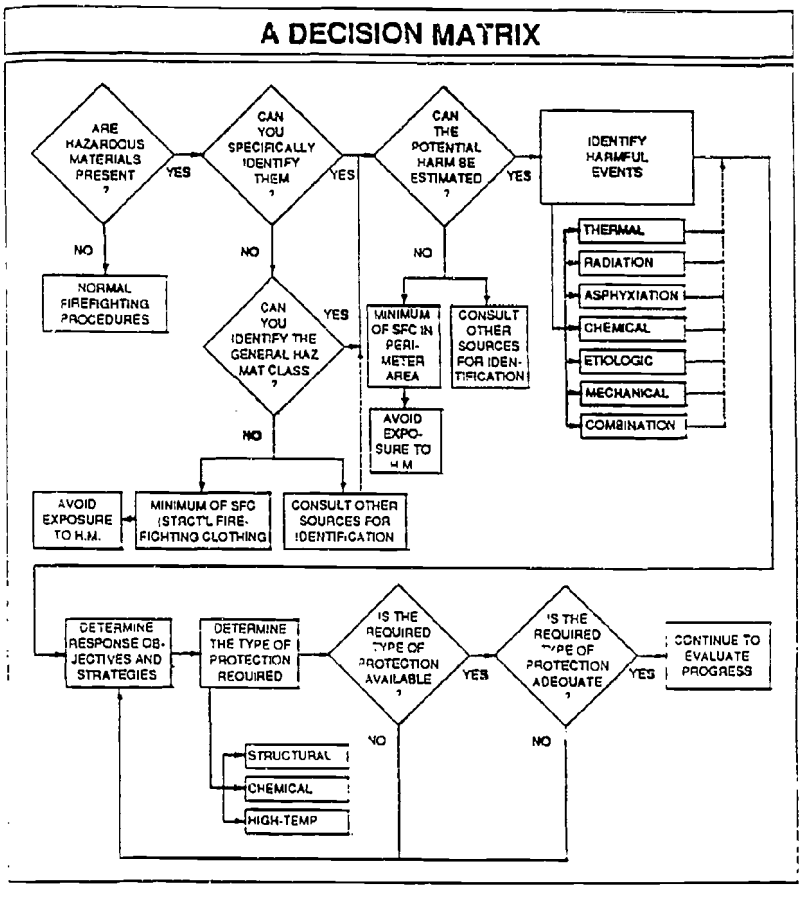
Components for hazard assessment include linking the name of the hazardous material with their associated assessment components. These components include but are not necessarily limited to:

General, health and fire hazards
Physical and chemical properties
Behavior and outcomes
Variables and modifying conditions
Protective equipment needs
Containment/control methods
Protective actions
Medical aid/treatment
Decontamination methods
Disposal/cleanup procedures

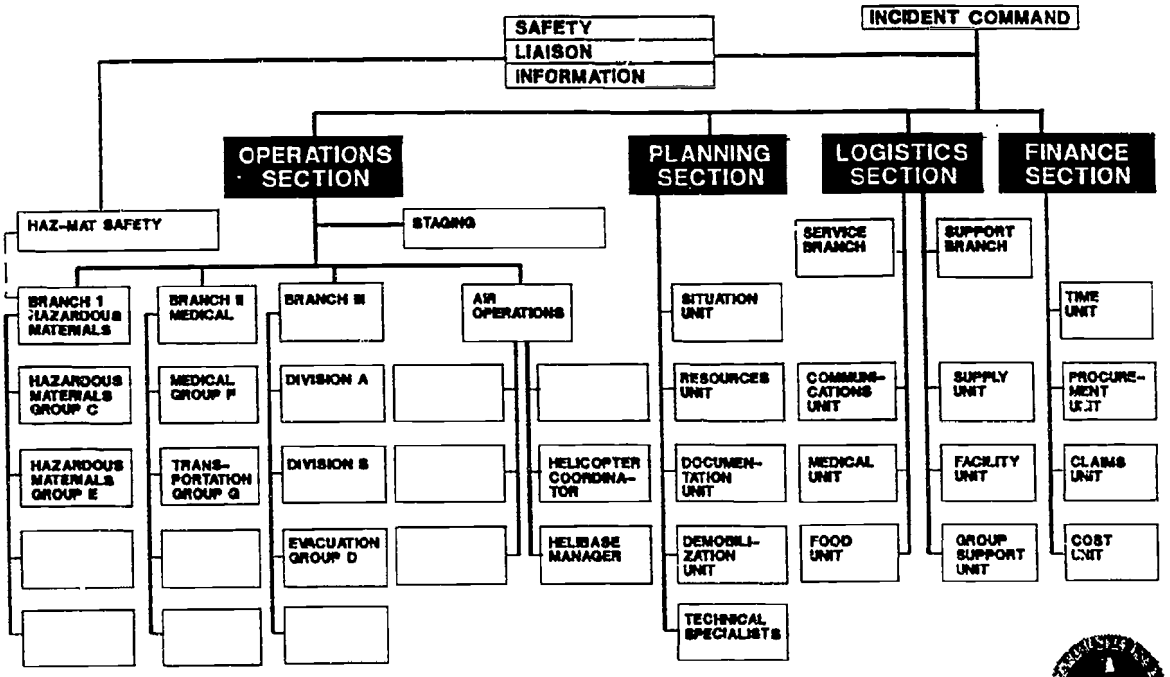
Other variables that will impact the hazard assessment:

Location (population area, traffic, etc.)
Time
Weather
Size of problem
Stage of the incident (release vs. non-release)
Nature of the chemical
Type, condition, nature, and behavior of the container
Amount, type, and training of the responders and equipment
Availability, type, and amount of control agents

Size-up of the situation will determine whether the Incident Commander will develop an offensive or defensive mode of operation. If the offensive mode is used, it allows the first responders and hazardous material personnel with the appropriate protection to operate in the exclusion zone and attempt to control the hazard. The defensive mode is one in which the exclusion zone is kept clear of personnel and personnel exposure is minimized. While most firefighting operations begin in the offensive mode, for hazardous materials a defensive option is more appropriate.



MULTIBRANCH ORGANIZATION *



* MULTIBRANCH ORGANIZATION (EXAMPLE) The Incident Commanders have activated all command and general staff positions and have established four branches in the Operations Section

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The definition of the Incident Command System (ICS) is:

> "The combination of facilities, equipment, personnel, procedures, and communications within a common organizational structure with responsibility for management of those resources at an incident scene."[7]

The overall objective of utilizing the ICS is to effectively coordinate all resources into a single command. The result of these decisions should decrease injuries, fatalities, and property and environmental damage. In order for the Incident Command System to be effective, common terminology to be used at the scene should be established prior to any emergency.

The organizational structure of the ICS must be defined prior to the occurrence of an accident or incident. The chart on the previous page shows a typical situation command structure. This structure may not apply to all hazardous materials incidents or accidents. It may be simpler, or much more complex, depending upon the circumstances and incident involved. However, in accordance with the National Fire Protection Association (NFPA) Standard 1561, an incident management system must have certain elements.

As shown in the organizational chart, the ICS's structure may be extensive. It should be flexible enough to accommodate any type of incident as determined by the size and condition.

NOTE:
FEMA-REP-5 (Guidance for Developing State, Tribal, and Local Radiological Emergency Response Planning and Preparedness for Transportation Accidents) is a good planning document that may be used as a guideline. You may obtain it by writing: Federal Emergency Management Agency, P.O. Box 8181, Washington D.C. 20024. Please reference FEMA-REP-5 in your request.

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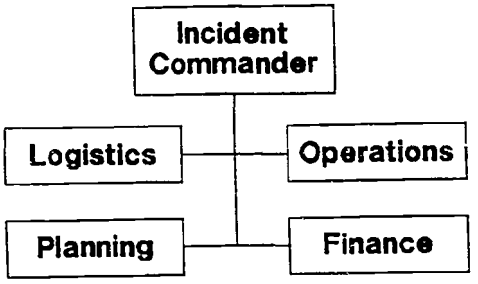
[7] **On Scene Incident Commander/Scene Manager**, California Specialized Training Institute.

INCIDENT COMMAND SYSTEM

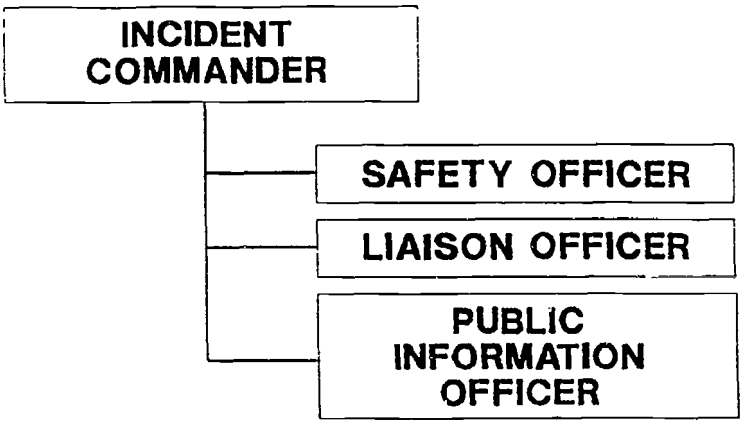
Five Functions



The five functional areas of the Incident Command System are:

Incident Commander
Planning Section
Operations Section
Logistics Section
Finance Section

Each of these areas have their own responsibilities for the timely mitigation of the overall incident.



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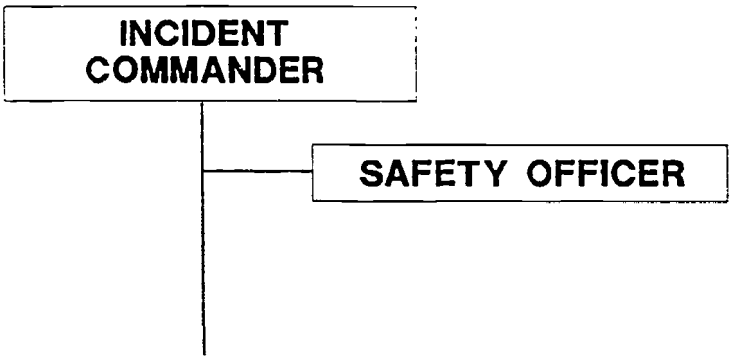
The first functional area, Incident Commander, has three positions reporting directly to it. They are the Safety Officer, Liaison Officer, and Public Information Officer.

The first task is assigning an Incident Commander. This person takes responsibility of the incident and would have the ultimate responsibilit to end the emergency in as little time as possible. This person will delegate specific activities to others in the chain of command, usually established in the planning stage of the ICS. Incident command may be transferred one or more times to others who are more competent in dealing with the particular incident. One of the first duties of the Incident Commander is to establish a "command post" close enough to the incident so the Incident Commander can have a firsthand look at the incident proceedings. (See diagram on "Hazardous Incident Response Team Control Zone Layout.")

The command staff members, operating in direct support and with the authority of the Incident Commander, issue orders and instructions to other members of their particular teams. They should keep the Incident Commander informed of progress on a regular basis.



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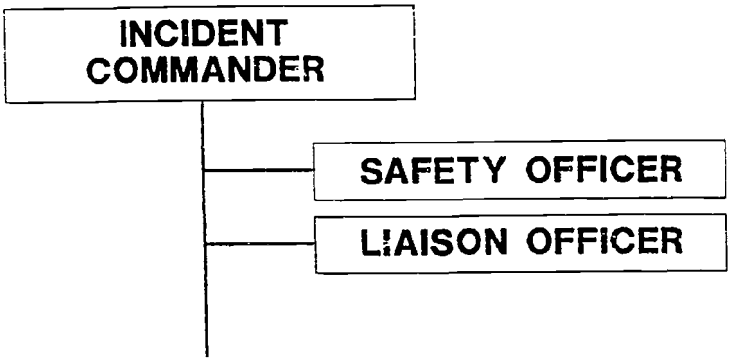
SAFETY OFFICER

The Safety Officer, a member of the command staff, is responsible for monitoring and assessing hazardous and unsafe situations and developing measures for ensuring personnel safety. Although the safety officer may exercise emergency authority to stop or prevent unsafe acts when immediate action is required, the officer will generally correct unsafe acts or conditions through the regular line of authority. The officer maintains awareness of active and developing situations, approves the Medical Plan, and includes safety messages in each Incident Action Plan. If the incident is large the officer will have sector safety officers, and if the incident is small the Incident Commander may in fact be his/her own SAFETY OFFICER.

The Safety Officer works closely with the Incident Commander to ensure that safety concerns are implemented and followed. The Safety Officer should have sufficient expertise in the safety field to assume these duties. However, the ultimate responsibility for the safety of all personnel at the incident scene rests with the Incident Commander. Safety is a command responsibility, using the expertise of the command staff and operation section's chief officers for guidance.

SAFETY IS ALSO A PRIMARY CONCERN/RESPONSIBILITY OF ALL PERSONNEL.



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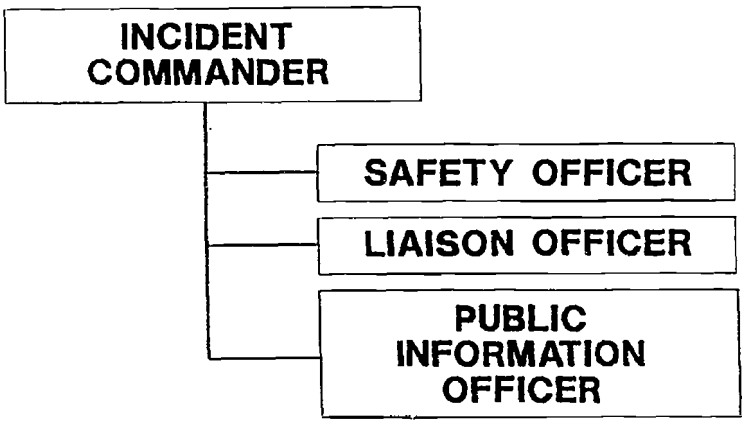
LIAISON OFFICER

The Liaison Officer is a member of the command staff and is the point of contact for the assisting and cooperating agency representatives. This includes agency representatives from other fire agencies, National Red Cross, law enforcement, public works, engineering organizations, and many others. The liaison officer should be from the agency having jurisdictional authority.



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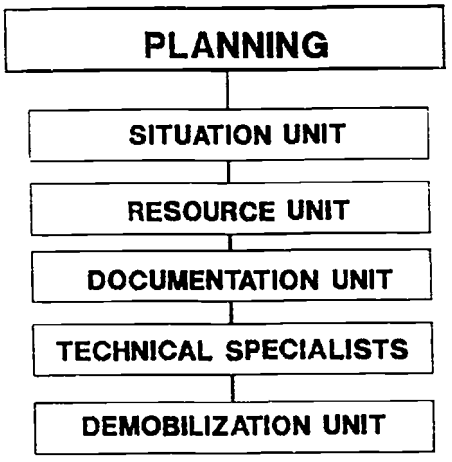
PUBLIC INFORMATION OFFICER

The Public Information Officer's main duty is to disseminate accurate and complete information as to the cause, size, and intensity of the incident, plus the current situation, the agencies committed, resources utilized, and any other information requested by other agencies including the news media. An individual with sufficient expertise should coordinate this activity. Only one information officer should be appointed to any incident and should have the authority to speak for the Incident Commander. If needed, a Department of Energy representative will be available for assistance in the event of a WIPP transportation incident.



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The Planning Section is responsible for the collection, evaluation, dissemination, and use of information and data pertaining to the incident and the status of resources. This information is used to understand the current situation, predict a possible course of incident events, and prepare alternative strategies and control operations and options for the incident to be brought to a successful conclusion.

The Planning Section Chief establishes information requirements and reporting schedules for all incident response elements used in preparing the incident action plan. The Planning Section Chief notifies the resource unit of activation of the unit, including the names and locations of assigned personnel, and supervises the incident action plan. He/she is also responsible for performing periodic assessment predictions on the incident potential, and other duties as assigned by the Incident Commander. They should keep the log of progress for the duration of the incident and advise the Incident Commander of significant changes in status.

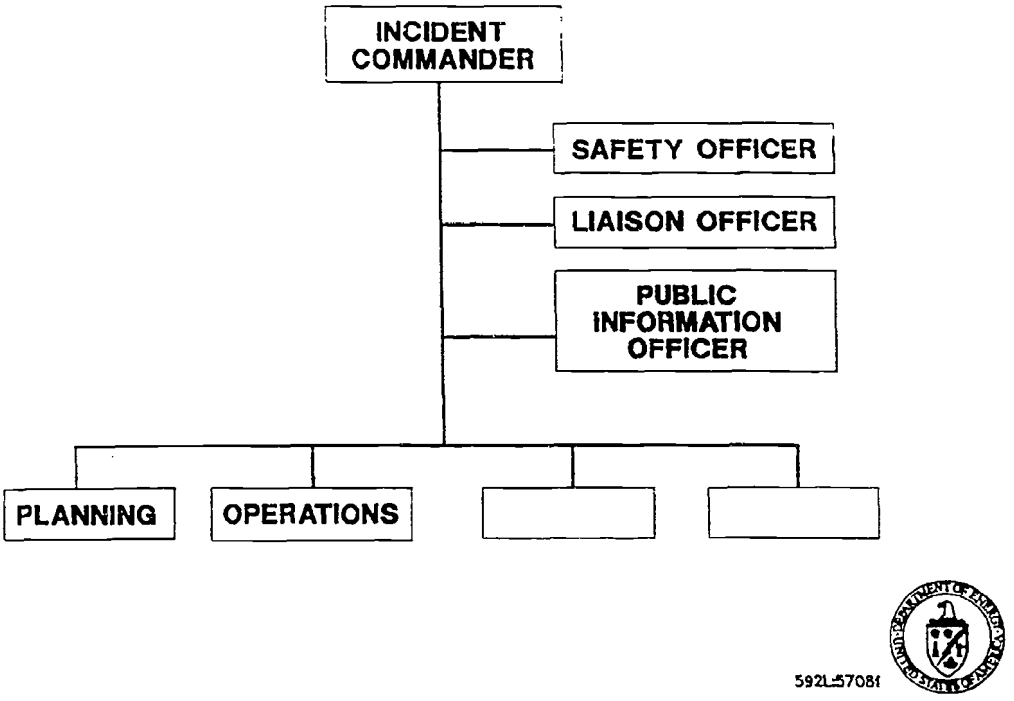
The Situation Unit may adjust existing plans to reflect the availability of resources. The unit will collect incident data beginning with the earliest possible occurrence and continue until termination of the incident. The chief will assign duties to Situation Unit personnel and confirm estimated time of arrivals. The unit may request additional personnel for their unit as required.

The Resources Unit will work closely with the Logistics Section to help in identifying and accessing resources. The unit will establish a check-in function at incident locations. It will maintain a command post display, to include a map of the scene and other impact areas such as downwind evacuation areas and staging locations and safe routes to and from the scene, as well as an organizational chart and deployment section. It is in charge of establishing incident facilities via telephone or through the communications center. It will gather, post, and maintain incident resource status, transportation status, support personnel and vehicle status, and maintain a master roster of all resources checked in at the incident.

The Documentation Unit is responsible for recording/protecting all documents pertaining to the incident, such as: MSDSs, Shipping Papers, incident reports, communication logs, injury reports, and situation status reports. It will establish and organize incident files, prepare reports, complete forms, and check the accuracy and completeness of the records, reports, and forms. The Documentation Unit is tasked with correcting errors or omissions by contacting other incident units. It will keep a record of all documentation for future reference. It will help organize critiques of the incident at a later date to help improve the emergency communities ability to respond to the next similar incident. The successes and problem areas are to be discussed to help improve the process; this is required by OSHA in 29 CFR 1910.120(q)(2)(x).

Technical specialists are advisors with special skills and abilities needed to support and help mitigate incident operations. These technical specialists may report to the Planning Section, form a separate unit, be assigned to operations directly, or beassigned to other units as required.

The Demobilization Unit's main function is to ensure that at the conclusion of the incident, demobilization is accomplished in an orderly, safe, and efficient manner. This function may also call for security for equipment left at the scene by agencies demobilized prior to the conclusion of the incident.



The Operations Section is responsible for all tactical operations at the incident. Its main function is stabilizing the incident and bringing it to a successful conclusion. It operates with direct involvement in rescue, fire suppression, law enforcement, or any other activity that would successfully terminate the incident. It also interfaces with the decontamination team and the operational EMS units which are under the operations officer.

The officers involved with the operations function should have a unified goal of implementing the Incident Commander's plan and control measures to bring the incident to a successful conclusion supporting the overall strategic plan of the Incident Commander. The Operations Officer reports to the Incident Commander, and is responsible for the management of all operations directly applicable to the primary mission[8].

The Operations Chief is a member of the general staff and prepares the unit operational plans, requests resources, and makes changes to the operational plan as necessary. The Operations Officer takes direct responsibility for and supervises all tactical operations at the incident.

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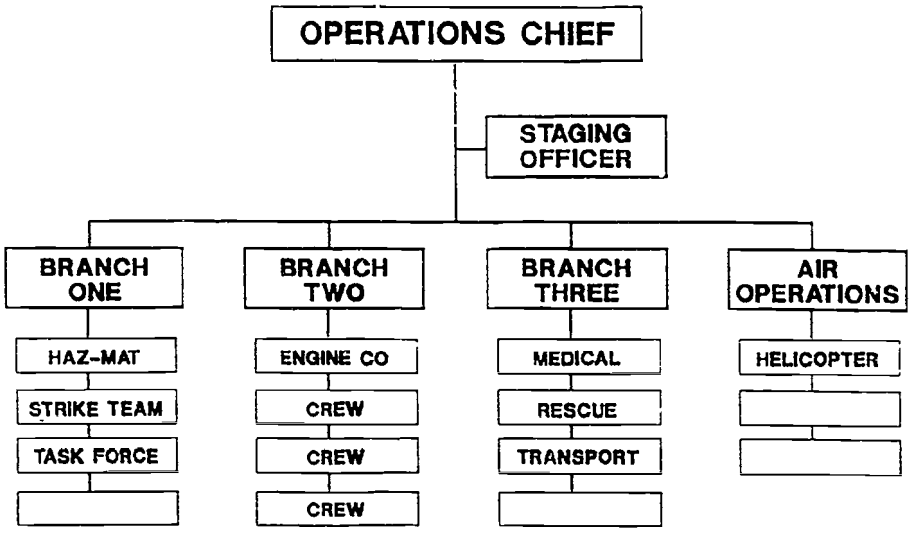
[8]Incident Command System, Fire Protection Publications. Oklahoma State University; 1983; pp 67



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The Operations Section works in accordance with the overall operational plan. The Operations Chief may request additional resources and establish a "staging area" for extra personnel, equipment, and/or supplies. Staging areas should be within a three-minute response time, however this is dependent on several variables such as scene location, incident dynamics, and weather. The staging area needs to be in a safe zone not subject to wind direction changes that may endanger the location from downwind hazards from the scene. The function of a staging area is to provide a check-in and holding area for resources until they are assigned a specific duty. Establishment of sanitation, rest, feeding, and medical facilities is usually done if it is anticipated that the incident will exceed eight hours.

Air Operations also come under Operations. However, this will not normally become necessary for a WIPP-related incident.

Teams must be designated units such as "Engine 1," Truck 12," or "Rescue 5." Such designations will enable the Operations Officer to direct units to appropriate areas of need.

OPERATIONS

Branches

- **Command Post**
  - **Located away from the staging areas**
- **Single resources**
  - **Law enforcement**
  - **Fire rescue**
  - **Medical**
- **Specialized task forces**
  - **Hazardous materials teams**
  - **Radiological assistance teams**
  - **Environmental control teams**

Branches use single resources and specialized task forces to stabilize and bring the incident to a successful conclusion. The complexity of the incident will determine the size of this area. Branches may be established for several reasons. Generally, if the Operations Officer has specialized task forces, such as a Hazardous Materials Team, Radiological Assistance Team, Environmental Control Team, backup Entry Teams, Decontamination Teams, and Emergency Control Team, these teams are placed in their own branch. Single resources, such as fire, police, or rescue, may be grouped into one branch. These single resources may have a commander to relay information to the Operations Officer. This depends on the size of the incident.

Depending upon the expertise required in the area, the three specialized task forces listed above may be one unit, or a combination of the three may comprise a unit.

Branches may be established when more than one jurisdiction is involved with the incident. When an incident crosses county/parish borders, involves state, local, and/or federal agencies, or more than one agency responds to the incident, branches may help the Operations Officer control the on-scene resources.

If a medical unit is involved in care of any victim in an incident, the medical group members will be assigned to the Operations Unit. This involves all personnel that are not part of a unit under the Incident Command System. The medical group will be responsible for rescue, extrication, patient transfer and decontamination, patient care, and other duties based on their expertise.

Resources are generally broken down into several unique and individualized units depending upon the expertise of the unit. Such units may be engine crews, law enforcement, medical personnel, strike teams, task forces, radiological assistance teams, state environmental units, and federal radiological assistance units. These resources may be grouped into operations branches as individual units or as part of another unit.

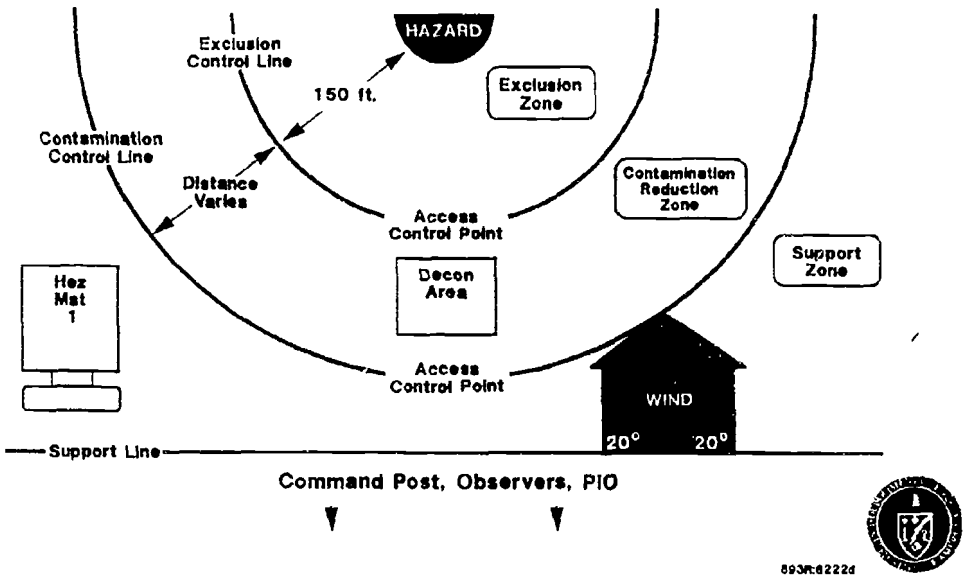
Single resources will generally be used for the initial attack and first response situations. They may also be dispatched in extended or reinforced attack or greater alarm situations. During the incident operation there is usually a need for single resource operations such as a single engine, helicopter, or law enforcement unit.

Task forces are any combination of resources put together for an assignment of a temporary nature. Task forces call for a leader with common communications between all resource elements. An example of a task force could include an engine, bulldozer, and hand crews working on a temporary assignment under the direct supervision of the task force leader. Task forces can be versatile in their combinations of resources. Combining several source units into an individual unit allows for ease of management and lessens span of control.

Strike teams are a set number of resources of the same kind and type, with common communications, operating under the direct supervision of a leader (usually in a separate vehicle). They are highly effective management units. The foreknowledge that all elements have the same capability, and the knowledge of how many will be applied, allows for better planning, ordering, utilization, and management. Strike teams are generally recommended for use with members of their own units and specialized areas of expertise.

Task forces and strike teams are encouraged to be used as often as possible in order to maximize the use of resources, reduce the management control of a large number of single resources, and reduce the communications load of the incident.

CONTROL ZONE LAYOUT

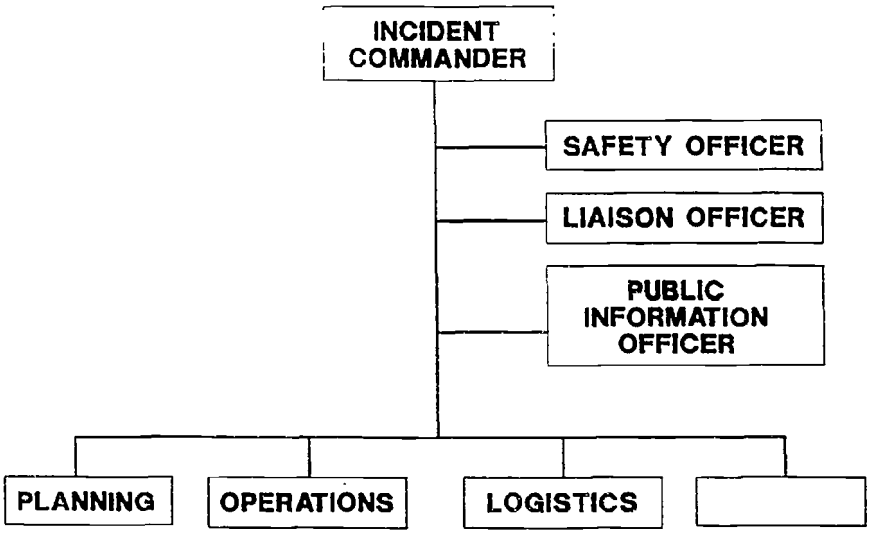


The command post and the staging area should not be located together, but should have a direct communication link to make deployment of resources immediate.

Both the command post and the staging area should be located upwind, upgrade, and upstream with the command post in a position that provides viewing (if possible) of the incident scene by the Incident Commander and his/her staff.

Staging areas are locations designated by the Operations Chief which are used to temporarily locate resources available for assignment. The Operations Officer may establish, move, and discontinue the use of any staging area. All resources within the designated staging area are under the direct command of the Operations Officer and should be located within three minutes of the incident scene. The Staging Area Manager will request logistic support (food, sanitation, fuel) as needed and usually only if the incident is expected to last over eight hours.

It may also be the Staging Officer's responsibility to maintain the status condition of the arriving units and units on scene. The status condition usually involves one of three conditions: ASSIGNED - performing an active assignment, AVAILABLE - ready for an assignment (all units in the staging area should be at this level of status condition), and OUT-OF-SERVICE - not ready or available for assigned status. Any unit in the out-of-service condition should be reported to the Operations Officer as soon as possible in order to keep him/her abreast of available resources.



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The Logistics Section is responsible for providing support and services to the Operations Section. The Logistics Section would provide facilities, transportation, supplies, equipment maintenance and fueling, food, communications, medical services, and sanitation facilities.

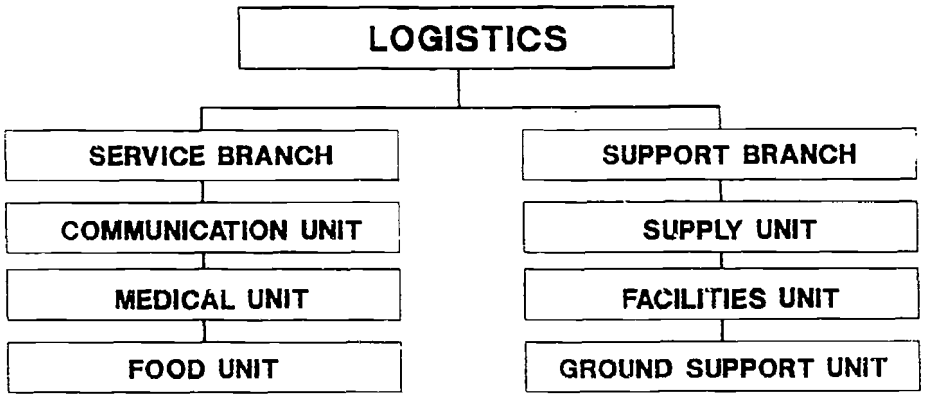
The complexity of the incident will be the determining factor for the extent of involvement of the Logistics Section.

The Logistics Section is an ongoing function at an incident scene, and it has to be able to adjust to changes in the incident. It may be split into two branches: the "Support Branch" and the "Service Branch". Again, this depends on the size of the incident.

The Service Branch consists of the "Communication Unit", the "Medical Unit," and the "Food Unit." The Communication Unit is responsible for developing plans for effective communications equipment and facilities, installing and testing communication equipment, distributing communication equipment, and maintening and repairing the equipment.

The Medical Unit is primarily responsible for developing an incident medical plan, developing procedures for handling any major medical emergency involving incident personnel, providing medical aid and transportation for incident-assigned injured and ill personnel, and assisting in the processing of all paperwork related to injuries or deaths of incident-assigned personnel.

The Food Unit is responsible for determining the food and water requirements, menu planning, food ordering, cooking facilities, cooking, serving, and general maintenance of the food service areas. Supplying efficient food services for any particular incident is an extremely important part of the incident operation. The Food Unit must be able to anticipate needs in terms of numbers of personnel to be fed, as well as any special feeding requirements due to the location (and type) of the incident. The Food Unit will be responsible for supplying meals during the entire incident, including staging areas, as well as any remote locations not within the initial incident scene.



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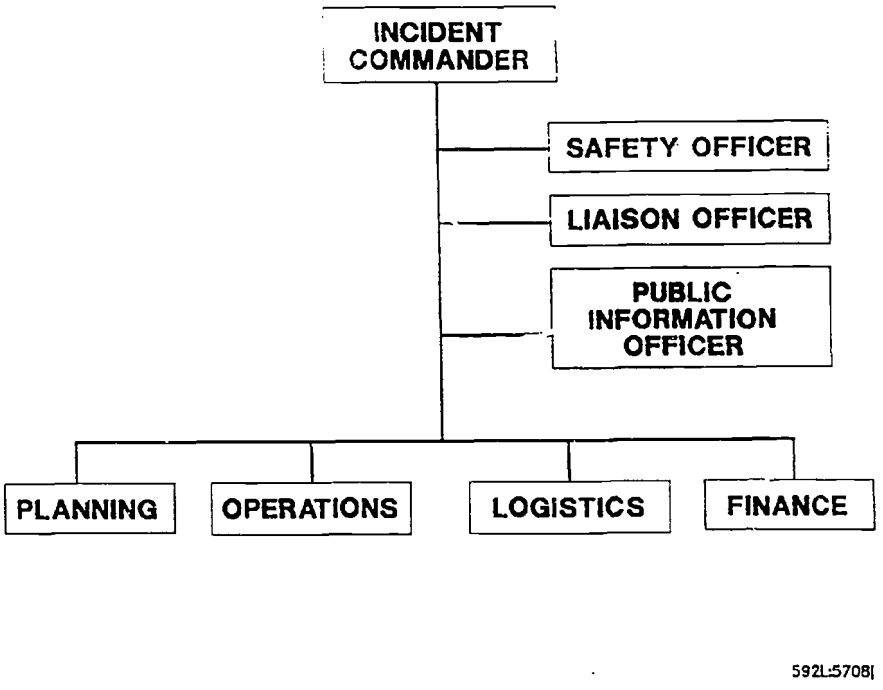
The Support Branch of the Logistics Section is comprised of the Supply Unit, the Facilities Unit, and the Ground Support Unit. The Supply Unit is responsible for ordering, receiving, storing, and processing all incident-related resources and supplies. When established, it has the basic responsibility at the incident for all off-site ordering. This may include all tactical and support services, all expendable and nonexpendable supplies required for incident support, and other supplies needed to successfully terminate the incident. The Supply Unit also has the responsibility for providing locations and personnel to receive, process, store, and distribute all supply orders. It must maintain accurate records of all supplies and items ordered for the incident. These records will be turned over to the Finance Officer for proper payment.

The Facilities Unit has the overall responsibility for establishing, setting up, maintaining, and demobilizing all facilities used in support of incident operations. The unit is responsible for providing any facility maintenance required and for providing security services at the incident. This unit will set up the command post, the incident base, and camps as well as trailers and /or other forms of shelters for use in and around the incident area. This unit will provide and set up necessary personnel support facilities which include feeding areas, sleeping areas, and sanitation and shower areas. The Facilities Unit may order, through the Supply Unit, any additional support items required (portable toilets and shower facilities, lighting units, etc.).

The Ground Support Unit is responsible for maintenance and repair of primary tactical equipment, vehicles, and mobile ground support equipment. The unit also has the responsibility on all incident-assigned ground equipment (including contract equipment) of fueling all mobile equipment, providing transportation services in support of incident operations (except air), and implementing the incident traffic plan. The Ground Support Unit must also provide the Resources Unit with up-to-date information on the status of transportation vehicles, their locations, and capability.



Finance is a responsibility that should be defined at the pre-planning stage, before the incident occurs. It is established on incidents when the agencies who are involved have a specific need for financial services. In the Incident Command System, all agencies may not require a finance section. In those cases, finance functions may be accomplished through the Planning Section by a Technical Specialist.

Traditionally, the person handling the finance function comes from a background such as city or county budget director, or the financial director of the jurisdiction involved. This Finance Chief will determine the need based on present and future requirements for specific units. In certain functional units (i.e., procurement) a finance unit need not be established if only one person would work in the unit.

Documentation of time for personnel and equipment may be obtained from reports and communication logs kept at the scene and dispatch centers.

Implementation of the Finance Section is generally done only for major incidents, or incidents requiring special responses beyond the expertise of the local responders.

The Time Unit is primarily responsible for ensuring that daily personnel time recording documents are prepared and compliance to agencies' time policies are being met. The Time Unit is responsible for ensuring that equipment time reporting is accomplished in the Logistics Section-Ground Support Unit for ground equipment, and in the Operations Section-Air Support Unit for helicopters.

If applicable, personnel time records will be collected and processed for each operational period. The unit leader may desire to have one or more assistants who are familiar with respective agencies' recording policies. Records must be verified, checked for accuracy, and posted according to existing policy. Excess hours worked must also be determined and separate logs maintained.

The Procurement Unit is responsible for administering all financial matters pertaining to vendor contracts. It will coordinate with local jurisdictions on sources for equipment, prepare and sign equipment rental agreements, and process all administrative paper work associated with equipment rental and supply contracts. Some agencies have this function assigned as part of the Supply Unit in the Logistics Section.

The Claims Unit is in actuality two separate units grouped as one. The Claims Unit consists of the Compensation-for-Injury Unit and the Claims Unit. It is important to recognize that these specific activities are different and may not always be accomplished by the same person.

The Compensation-for-Injuries Unit is responsible for all forms that may be required by workers' compensation programs and local agencies. The person performing this activity is also responsible to maintain a file of injuries and illnesses associated with the incident and to ensure that all witness statements are obtained in writing. Many of this unit's responsibilities are accomplished, or partially accomplished, in the Medical Unit. Close coordination with the Medical Unit is essential.

The claims function will be responsible for handling the investigation into all civil tort claims involving property associated with, or involved in, the incident. The unit will maintain logs of claims, obtain witness statements, document investigations, and perform agency follow-up requirements.

The Cost Unit is responsible for providing cost analysis data for the incident. It must ensure that all pieces of equipment and personnel which require payment are properly identified. It will obtain and record all cost data, analyze and prepare estimates of incident costs and maintain accurate records of incident costs. The Cost Unit will be called upon to provide input to the Planning Section in terms of cost estimates of resource use. The unit must maintain accurate information on the actual cost for the use of all assigned resources.

Section 10
RADIOLOGICAL ASSISTANCE TEAM OPERATIONS

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Describe the "tier" response and guidance criteria when on the scene of a WIPP transport incident

2) Describe the major duties of the Department of Energy Senior Official, the carrier, and the Regional Coordinating Office

3) Identify the areas of assistance provided to the I.C. by the RAT

4) Describe the basic team composition and equipment used by the RAT

5) Identify general and specific information the RAT will request in order to complete required actions at the scene

RADIOLOGICAL ASSISTANCE TEAM (RAT) PROCEDURES FOR TRUPACT-II TRANSPORTATION INCIDENTS[9]

The Radiological Assistance Teams (RATs) provide professional health physics assessment, radiation control, and measurements for any type of accident involving radiation. The Radiological Assistance Team is normally deployed to support state and local authorities, and is not intended to direct actions at the scene or assume command. However, during a Department of Energy TRUPACT-II transportation incident, the responsibilities of the Radiological Assistance Team are expanded from the traditional role.

The probability of a WIPP TRUPACT-II transportation incident presenting any significant amount of radiological contamination is extremely small due to container design.

Response to a TRUPACT-II incident has been developed into a tiered structure.

Tier 0 - Local law enforcement and carrier drivers assess the severity of the accident and determine the need for radiological assistance. A Department of Energy regional representative and a Public Affairs Officer may be required to handle public controversy.

TRUPACT-II STATUS: No noteworthy structural damage to a TRUPACT-II containing waste. No special deployment unless there is potential for public controversy and misunderstanding.

Tier I - Radiological Assistance Teams - A regional Department of Energy representative, Public Affairs Officer, and Radiological Assistance Teams with appropriate monitoring and communications equipment to assess the radiological status of the incident are deployed. WIPP Project Site Office contract carrier replacement drivers and TRUPACT-II container and tractor/trailer experts may also deploy to the scene.

TRUPACT-II STATUS: If the status of the TRUPACT-II is unknown, or if there is any penetration of the outer stainless steel protective skin of the TRUPACT-II, the Regional Coordinating Office should deploy the Radiological Assistance Team.

Tier II - The Incident/Accident Response Team (I/ART) provides increased aid to a serious incident with additional health physicists, a senior Department of Energy official, WIPP Transportation Manager, tractor/trailer experts, TRUPACT-II experts, and additional public affairs support.

TRUPACT-II STATUS: If there is penetration of the outer stainless steel protective skin of the TRUPACT-II, if there are decisions to be made regarding the integrity of the TRUPACT-II, or if there is potential structural damage to the TRUPACT-II or trailer, all of Tier I will be deployed plus the Incident/Accident Response Team in the Tier II level.

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[9] **Radiological Assistance Team (RAT) Procedures for TRUPACT-II Transportation Incidents**; U.S. Department of Energy, May 31, 1991, Revision 0

Tier III - The recovery team is provided by the carrier and will aid in cleanup operations.

TRUPACT-II STATUS: If it is determined that there is a radiological release or that the contents of the container need to be repackaged or transferred to another container, a hazardous assessment group will deploy along with the recovery team.

The teams and representatives outlined in the Tier response matrix will be deployed to the scene from the nearest DOE facility, or as directed by DOE-AL (Albuquerque). Response times will be dependent on several factors such as incident location, time of notification to include day of the week, weather conditions which may dictate mode of transport and routing at the time, and extent of local media incursion in and around the scene.

DEPLOYMENT OF TIERS

Tier	Criteria	Response
Tier 0	No structural damage	No deployment
	Potential for public controversy	Deploy DOE regional representative and regional PAO
Tier I	Status of TRUPACT-II unknown or limited damage	Deploy RCO, RATs, PAO, Communications
Tier II	Excessive damage to TRUPACT-II container	Deployment of I/ART, DOE senior official, in addition to Tier I deployment
Tier III	Radiological release cleanup/repackaging required	Recovery team, in addition to Tier II deployment

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The organizational structure and activities associated with Tier I, the Radiological Assistance Team (RAT), are presented in this chapter. The team members and types of expertise that should be considered for response to a TRUPACT-II transportation incident are listed and briefly discussed below. The severity of the incident will dictate the composition of the Radiological Assistance Team required at the incident scene.

1. Department of Energy Regional Coordinating Officer (RCO) - Maintains the required liaison/coordination with those local, state, and federal organizations designated to assist in emergency response. This individual also ensures internal Department of Energy coordination during Tier I deployment.

2. Department of Energy Public Affairs Officer - This individual is the primary Department of Energy contact to the news media at the incident scene.

3. Communicator - Individual responsible for relaying information and requests for additional resources to the Department of Energy-Albuquerque. This individual must have the expertise to ensure field communications are available for voice and/or fax copies. This individual would come from the Department of Energy or contractor that provides this equipment.

4. Radiological Assistance Team Captain - A senior contractor or laboratory employee having the responsibility for the Radiological Assistance Team and its response activities. The Radiological Assistance Team Captain receives his general response directions from the Department of Energy Regional Coordinating Officer or the Department of Energy senior official at the incident site.

5. Radiological Assistance Team - This team is composed of health physicists, industrial hygienists, and technicians. Designated duties are: radiological monitoring, radiological assessment, hazardous materials assessment, contamination control, logistics, and communication support.

TYPICAL RADIOLOGICAL ASSISTANCE TEAM EQUIPMENT

- 2 - 6 radiological health physicists
- 2 - dual frequency portable radios
- 4 - β - μ (beta/gamma) monitors
- 4 - α (alpha) monitors
- 1 - neutron monitor
- 1 lot -health physics supplies

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TYPICAL RADIOLOGICAL ASSISTANCE TEAM (RAT) ACTIVITIES

- Assess severity/potential radiological impact
- Perform surveys and measurements
- Inform on-scene commander of findings
- Maintain chronological events/decisions log of DOE activities
- Provide assistance with decontamination
- Request further assistance/backup support

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Regional Radiological Assistance Team (RAT)

Determines, via measurement, if a radiological release has occurred.

Provides a minimum suite of equipment, including: FIDDLERS for plutonium detection, alpha and beta/gamma instrumentation, air sampling/analysis capability, swipe survey equipment, personnel protective clothing, and routine health physics supplies.

Determines the location of and damage to the TRUPACT-II via visual inspection and determines, to the extent possible, if the damage has penetrated the outer and inner containment vessels. Also determines the location of the tractor/trailer (on/off highway, upright, or turned over) and opinion of the driver, if available, as to the road worthiness of the tractor-trailer involved in the incident. Provides this information to their Emergency Operations Center or the Regional Coordinating Office, depending on how the communication flow is set up.

Communicates with state and local officials to verify and cross-reference radiological measurements, and to determine any issues the state, local, and tribal governments may have regarding the response.

Based on the accident scenario, determines the worst-case estimate of dose consequences and a rough cleanup. Determines whether or not there was a fire and if personnel, who may be potentially contaminated, have left the scene of the accident.

Determines the extent to which the Regional Radiological Assistance Team resources can handle the existing radiological problem until a management/evaluation team from Albuquerque arrives. Continues to support the Department of Energy response by advising the evaluation team and Department of Energy Senior Official regarding radiological conditions, as necessary, until released by the Department of Energy Senior Official.

Provides all the above information to their Regional Coordinating Office who then provides this information to Albuquerque.

Responds in accordance with the TRUPACT-II Radiological Assistance Team response procedure generated by Albuquerque.

COMMUNICATION AND MONITORING EQUIPMENT

Standard communication equipment for the Radiological Assistance Team is required. Authorized frequencies by the Federal Communication Commission are 171.2 MHz and 171.950 MHz nationwide for radiological emergencies. Primary and backup communications are required to ensure communications are not compromised.

Radiological Assistance Team monitoring equipment for response to a TRUPACT-II transportation incident should consist of these types of hand-held instruments, in additions to the normally deployed Radiological Assistance Team equipment:

Eberline ESP-2 (or equivalent) with alpha, beta-gamma, and low-level gamma detector attachments.

Instrument to perform gamma dose rate measurements

PROTECTIVE AND MISCELLANEOUS EQUIPMENT

Protective clothing and respirators available to Radiological Assistance Team members should be adequate to provide protection against radioactive contamination. Miscellaneous equipment designated for Radiological Assistance Team response to a transportation accident will provide support for first aid needs, contamination control, and calibration check sources.

This protective clothing consists of a Tyvek suit, Tyvek boots (used only if the suit is not one-piece), hood, hard hat, rubber boots (if needed for wet or abrasive environments), and a U. S. Department of Interior, Bureau of Mines and U.S. Department of Agriculture accepted and approved respirator. This respiratory protection must comply with OSHA regulation 29 CFR 1910.120 and 1910.134.

OPERATIONAL PROCEDURES

NOTIFICATIONS - The WIPP Central Monitoring Room Operator will be contacted at the time of the incident. The Department of Energy employee first receiving notification of a TRUPACT-II transportation incident will obtain as much information as is available. A Radiological Assistance Program Incident Report Information Form will be completed at that time.

Radiological Assistance Team

1. Assesses the extent of the radiological incident via measurement and determines if a radiological release from the TRUPACT-II has occurred.

2. Determines the need to establish an exclusion zone at the scene or modify an existing exclusion zone.

3. Assists in setting up a contamination control station if needed.

4. Records all measurement information in legible form, recording at least a minimum of the types of information required in the Radiological Assistance Team Data Measurement Information.

5. Assists the Department of Energy Senior Official or Regional Coordinating Officer in gathering the following information at the incident site:

   a. Determines if the radiological incident is of a magnitude that requires additional radiological support teams to respond.

   b. Determines the extent of damage to the TRUPACT-II container by visual inspection. Determines, to the extent practical, if the damage has penetrated the outer and/or inner containment vessels.

   c. Assesses location and accessibility of the TRUPACT-II container for recovery plans, specifically, if the trailer is on or off the highway; if it is upright or turned over; if it is impacting traffic flow, which container is damaged, and where the damage is on the container.

   d. Communicates with transport drivers to assess condition of transport tractor and/or trailer, and proceeds with replacement procedures if necessary.

6. Coordinates radiological measurements with state and local radiation protection teams if present.

7. Estimates dose consequences and areas of contamination based on the incident.

Section 11
TRUPACT-II RECOVERY

ENABLING OBJECTIVES

At the completion of this section, the student will be able to:

1) Explain the TRUPACT-II recovery operations and what equipment is needed.

2) Identify the two primary methods of recovery operations for the TRUPACT-II transportation incident.

TRUPACT-II RECOVERY[10]

An estimated 20,000 shipments of transuranic waste are programmed to be delivered to the Waste Isolation Pilot Plant in southeastern New Mexico. These shipments will come from a total of ten transuranic waste generating and storage sites. During the transportation of these wastes, shipments will traverse some twenty-three states. During the Test Phase of the WIPP, however, only five states will be involved.

Department of Energy shipments of transuranic waste materials involve regular Department of Transportation (DOT) requirements for shippers and carriers of hazardous materials. The shipper has the primary responsibility and is the primary point of contact in the event of an incident. The shipper is required to have the means and mechanism to mitigate an accident. As the severity of an incident is evaluated and recovery operations begin, regional offices and/or close-by DOE facilities assist in the recovery of the packages.

Due to the number of shipments and the level of public sensitivity to these shipments, it is recognized that a defined accident response organization is required. This organization will interface with the Incident Commander when they arrive on the incident scene.* In accordance with DOE-AL's roles and responsibilities, they will act as a strike team in the Operations Unit of the Incident Command System. Because of these considerations, a transuranic waste transportation radiological emergency response would be different than a typical Radiological Assistance Program response. Since the Department of Energy has shipping, transporting, and receiving responsibilities for transuranic waste contained in the TRUPACT-II containers, the Department of Energy will not wait for a request from an outside agency to evaluate the severity of the incident, mobilize response elements (if required), and take mitigating actions. These actions are required of any shipper/carrier should an accident occur involving hazardous materials. Due to the direct monitoring of all shipments via the Transportation Tracking and Communication System (TRANSCOM), notification of an incident involving the TRUPACT-II transporter will be received by the Central Monitoring Room at the Waste Isolation Pilot Plant near Carlsbad, New Mexico, and the TRANSCOM Control Center at Oak Ridge, Tennessee.

*The Department of Energy will not attempt to assume command from the designated local authorities

[10]**Emergency Response and Recovery Roles and Responsibilities for TRUPACT-II Transportation Incidents;**, U.S. Department of Energy, Revision C, June 6, 1991

The response organization can be pulled together from the offices with the most knowledge and expertise and will be consistent with those utilized for other mission assignments already in place. The actions to consider for emergency response include: (1) determining if a radiological release has occurred; (2) determining the status of the TRUPACT-II; (3) determining the status of the tractor-trailer and the carrier responsibilities; (4) determining the Department of Transportation requirements and regulations to be met; (5) determining if a recovery team is needed to actually perform the mechanical and logistic activities associated with getting the shipment back on the road; and (6) interfacing with the state and local officials on each step of the evaluation and assessment process.

Normally the Radiological Assistance Team, which includes a Department of Energy representative from the region in which the incident occurred, can, during the early phases of the incident, provide the assessment of radiological release and interface with the local officials and media until the evaluation team arrives. A Department of Energy management representative will deploy with the necessary transportation and/or TRUPACT-II recovery experts from the WIPP or other facilities, as needed. These individuals would be responsible for determining the status of the TRUPACT-II and tractor-trailer, of assuring the Department of Energy Manager of the integrity of the shipment, and ensuring it can meet Department of Transportation requirements and regulations.

These responses should always be considered a "staged" or "tiered" response.

TRUPACT-II RECOVERY OPERATIONS

This section delineates the equipment and steps necessary to recover a Transuranic Package Transporter (TRUPACT-II) package as a result of an accident or incident. It is intended to apply to all recovery situations, but may require local modifications due to actual conditions encountered. If an accident has occurred which renders the trailer inoperable, but in which the TRUPACT-II packages are undamaged, the Waste Isolation Pilot Plant (WIPP) Central Monitoring Room (CMR) operator (505-885-6883) should be contacted to coordinate a replacement trailer and necessary material handling equipment to transfer the package to a replacement trailer.

This section addresses only the recovery aspect of an accident or incident. It assumes that any actions to save lives have been initiated/completed.

GENERAL INFORMATION[11]

State governments have statutory responsibility for command and control of an accident scene. Accordingly, the Person in Charge (PIC) of the TRUPACT-II recovery operation will serve as technical advisor to the Incident Commander. The person in charge should normally be a carrier representative. However, in the interest of expediency, and pending arrival of a carrier or DOE representative, the person in charge may be designated by the Incident Commander.

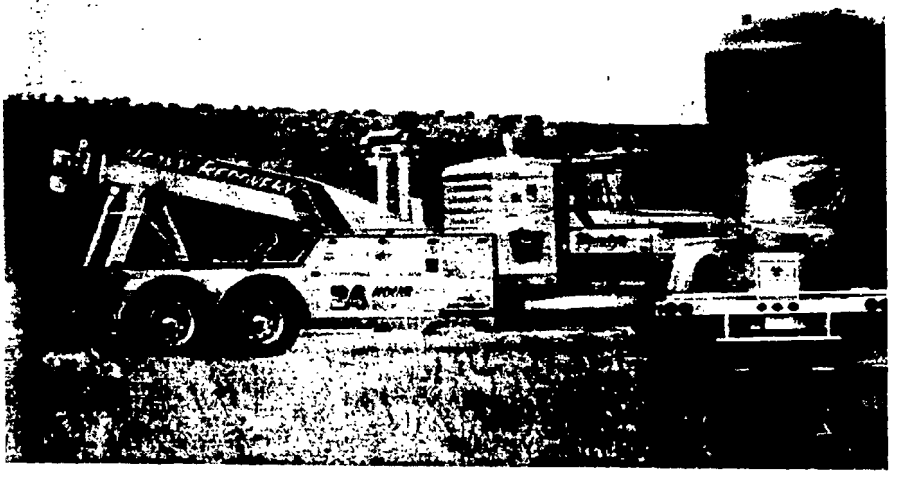
Prior to implementation of the recovery operation, a radiation survey will be made at the direction of the state representative. Once the area is determined to be radiologically controlled, with no TRUPACT-II package leakage, the recovery operation may commence. If contamination is encountered which would preclude initiation of recovery operations, the state representative should be advised to contact the Department of Energy for assistance. Any cleanup required will be performed by a carrier subcontractor under the direction of the shipper in cooperation with the state to ensure proper cleanup levels.

[11] "TRUPACT-II Recovery Guide"; Waste Isolation Pilot Plant; June 1991, Revision 1

METHOD OF RECOVERY

Recovery of a damaged TRUPACT-II trailer and tractor will be accomplished by a commercial Class 8 wrecking service. Subsequent return to Department of Energy custody will be arranged by the Department of Energy Waste Project Integration Office Transportation Manager or representative. The recovered TRUPACT-II container(s) will be sent to a location designated by the Department of Energy Waste Project Office Transportation Manager or his representative.

If a separated TRUPACT-II package is an obstacle to the orderly flow of traffic, and radiation levels have been found not to exceed Department of Transportation limits, the package may be carefully pushed, rolled, or pulled by using a sling, chain, etc. (in short movements to maintain control of the package) to the side of the road to allow traffic to pass.

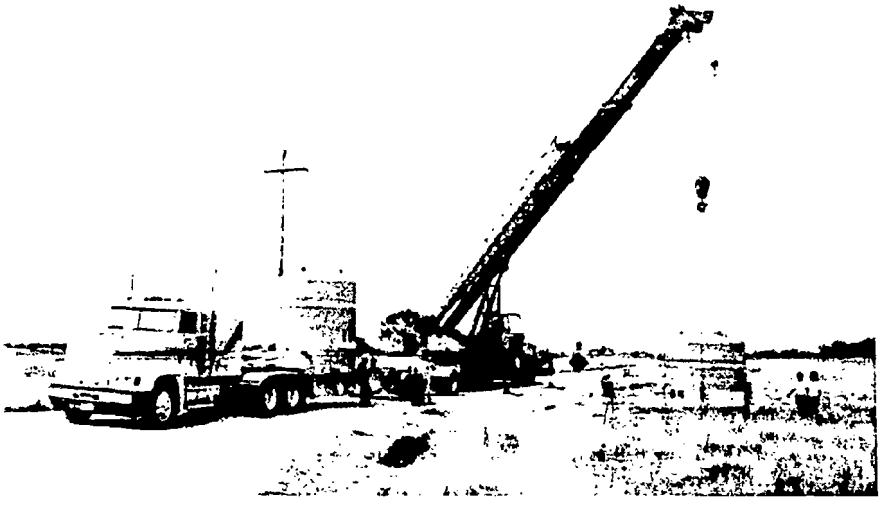


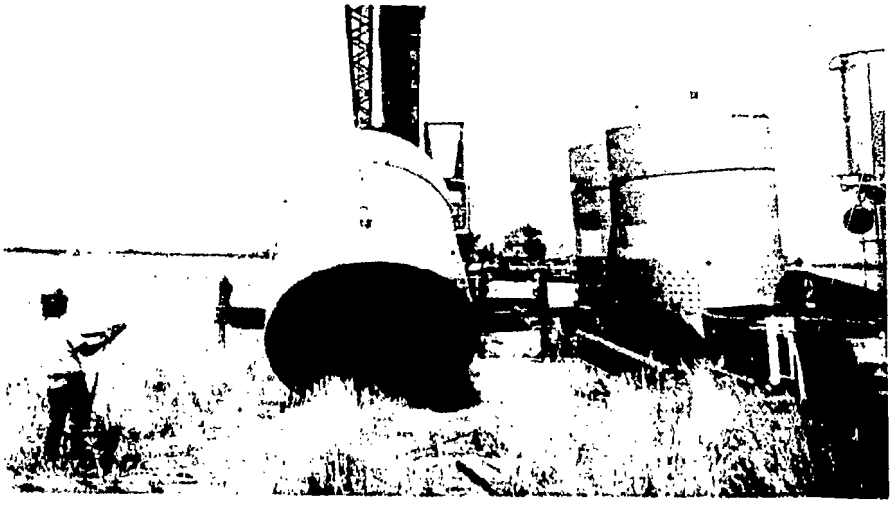
RECOMMENDED EQUIPMENT

In order to expedite recovery operations, the equipment and personnel cited in Attachment 1 of the Recovery Guide should be obtained from the nearest co mercial vendor. Crane specifications are the minimum required. Should the contractor d ers be incapacitated, the Incident Commander may designate an individual to initiate procurement of the equipment pending arrival of a carrier or Department of Energy representative.

The hoisting slings and lift components must have current proof load certifications labels and tags attached or documented and be checked prior to lifting in the recovery operation. Hooks must be equipped with safety clips to preclude the sling from slipping from the hook.

Thirteen special lifting lugs for attachment to the TRUPACT-II containers, twelve pounds of Type 304 stainless steel welding rod, and one lift-sling alignment strap are carried with each carrier's tractor to ensure availability at the recovery scene.





RECOVERY STEPS

On a priority basis, the person in charge shall implement a recovery plan which provides for TRUPACT-II containers first, and the transport vehicle second. The latter should be delegated to a Class 8 wrecker or local equivalent (Class D) service.

(NOTE: As tie down devices attached to the TRUPACT-II must meet Nuclear Regulatory Commission (NRC) stress requirements for the container, no attempt will be made to attach any device/lug to the container for use as a tiedown. Due to the expected time required to get a replacement TRUPACT-II trailer to the recovery scene, the horizontal transport method on a standard flat bed or a low-boy trailer is preferred.)

If the trailer is damaged and the TRUPACT-II packages are still attached, a sling alignment strap for vertical transfer of the TRUPACT-II package is carried on board the tractor. To ensure safety and to expedite the recovery procedure of vertical TRUPACT-II packages, the use of two single lift slings is preferred. These slings will be used in conjunction with the lift sling alignment strap as shown in Attachment 2. This method of transfer precludes the requirement for attaching lifting lugs.

If the person in charge determines that a replacement TRUPACT-II trailer can be made available in a reasonable time period, the TRUPACT-II packages can be lifted vertically as shown in Attachment 2 or as an alternate method, as shown in Attachment 3 of this manual. When using the alternate method, the lugs attached for lifting will not be used as transport tiedowns. If the terrain lends itself to the use of a forklift, and a 16-ton forklift is immediately available, the person in charge may elect to use this method of recovery.

As a rule, TRUPACT-II packages involved in off-normal events will be transported in a vertical position only on TRUPACT-II trailers using the tiedowns provided, and the packages will be transported in a horizontal position on any other trailer.

Prior to the start of recovery operations, the person in charge will check with the Incident Commander to ascertain that it is safe to begin operations. Vehicles used to transport TRUPACT-II packages must comply with all applicable Department of Transportation requirements, including use of placards.

Transport of a TRUPACT-II container should be performed by a carrier in possession of a current Environmental Protection Agency (EPA) identification number for the transport of hazardous materials. Dawn Enterprise drivers at the scene, replacement Dawn Enterprise drivers, or those employed by a firm with a valid Environmental Protection Agency identification should be used. If the Incident Commander determines that immediate removal of the waste package is necessary to protect human health or the environment, the Incident Commander may authorize the removal of the waste by transporters who do not have Environmental Protection Agency identification numbers and without preparation of a manifest. Once loaded, they will travel, with escorts, at speeds not to exceed 40 miles per hour. Any lifting lugs attached per this guide should be "rendered inoperable" prior to transport. This may be accomplished by tagging and taping in such a manner as to cover the hole. The state in which the accident or incident occurs may desire to conduct a vehicle inspection prior to movement. Any replacement carrier is also required to have the minimum levels of financial liability ($5 million) required for highway route controlled quantities of radioactive material. If a highway route controlled quantity of radioactive material is involved in the shipment, replacement drivers must be properly trained.

TRUPACT-II TRAILER AND PACKAGE SEPARATION

This section is to be used for removing TRUPACT-II packages from an inoperable trailer. Procedures for installation of tiedowns on a replacement TRUPACT-II trailer or replacement of broken tiedowns are also included.

To release the tiedown tensioning mechanism, remove the security locking device (spring pin) on the mechanism. Lift or pivot the release handle up toward the TRUPACT-II package base to release the tiedown tension. Then pull the tiedown U-bolt out and off the tiedown lug on the TRUPACT-II package.

Should the U-bolt on each package tiedown mechanism be inaccessible or inoperable, remove the U-bolt on each package tiedown mechanism by using a wrench or cutting the tiedown U-bolt.

HORIZONTAL RIGGING/HANDLING OPERATIONS WITH WEB SLING

In order to handle a TRUPACT-II in the horizontal position, use the following steps:

1) Place the lifting straps under the TRUPACT-II package as shown in Attachment 4 of this manual. Take note of the strap's approximate location in the sketch relative to the TRUPACT-II package center of gravity.

2) Using the crane, slowly apply tension to the lifting straps until all the slack has been taken out and the position of the lifting straps has stabilized.

3) Slowly increase lifting tension on the lifting straps until the TRUPACT-II package is just clear of the ground at all locations, and verify that the TRUPACT-II package is hanging securely.

4) Minimizing the lift to the minimum lift height required, place the TRUPACT-II package on the recovery trailer as shown in Attachment 5.

5) Secure the TRUPACT-II package to the recovery trailer in the horizontal position.

HORIZONTAL LIFTING USING WELD-ON LUGS

1) Retrieve a pair of weld-on lifting lugs and welding rod from the TRUPACT-II tractor. CAUTION: Take appropriate safety measures to prevent eye damage to the welder or bystanders and prevent fire or personnel burns from sparks and hot welding materials.

2) Attach the lugs to the TRUPACT-II package as shown in Attachment 6. The welder must meet American Society of Mechanical Engineers Section 9 qualifications and use process "Shielded Metal Arc Welding," if possible. To minimize heat buildup, it is suggested that lugs be tacked in place and then welded alternately, one rod per lug.

3) Attach lift cables to the lugs and crane hook.

4) Slowly increase lifting tension on the cables until the TRUPACT-II package is just clear of the ground at all locations and verify that the TRUPACT-II package is hanging securely.

5) Minimize the lift to the minimum height required and place the TRUPACT-II package on the recovery trailer as shown in Attachment 5.

6) Secure the TRUPACT-II package to the recovery trailer in the horizontal position.

SECURING A TRUPACT-II PACKAGE TO A RECOVERY TRAILER

1) Verify the TRUPACT-II package is properly positioned and in the horizontal transport position on the recovery trailer as shown is Attachment 5. Secure package position on the trailer with wood blocks fastened to the trailer deck as shown in Attachment 5.

2) Obtain four web tiedown straps and attach one end of a web strap to a trailer tiepoint along the side of the trailer at the midpoint of the TRUPACT-II package.

3) Bring the strap over the top of the TRUPACT-II package and secure the loose end to the trailer strap tensioning device.

4) Using the strap tensioner, take up the slack in the strap until the strap is taut to the touch.

5) Spacing the straps approximately equidistant along the TRUPACT-II package, repeat the above steps for the second, third, and fourth straps.

6) Any lifting lugs attached per this guide should be rendered inoperable prior to transport. This may be accomplished by tagging and taping in such a manner as to cover the lifting hole.

VERTICAL LIFTING FOR REPLACEMENT TRUPACT-II TRAILER TRANSPORT

The ideal method for this transfer is by use of a large forklift to lift the TRUPACT-II package off the defective trailer and reposition the package onto the replacement TRUPACT-II trailer. If only the trailer is damaged, transfer by forklift is the preferred way TRUPACT-II packages should be transferred to a replacement trailer. However, a special sling designed for vertical transfer of the TRUPACT-IIs is available on the tractor if a suitable forklift can not be located in a reasonable time period. Use of this sling precludes the requirement to attach lifting lugs and is the desired method of lifting.

The following steps are provided to handle the package without a suitable forklift, if the packages are damaged and separated from the trailer:

1) Attach the lift sling alignment strap on the package by aligning the loops on the strap directly in line above the forklift lifting pockets. Place the alignment strap on the TRUPACT-II.

2) Feed the lifting sling through the forklift pockets and up through the loops on the alignment strap. Attach the lifting sling eyes to the crane hook and apply tension to the sling. Lift the package clear to check that it is hanging securely.

3) Use the minimum lift height required to place the TRUPACT-II package on the replacement TRUPACT-II trailer.

4) Secure the vertical TRUPACT-II package to the replacement TRUPACT-II trailer with the standard U-bolt tiedown assemblies in accordance with the normal transport procedure.

ALTERNATE METHOD, VERTICAL LIFTING FOR REPLACEMENT TRUPACT-II TRAILER TRANSPORT

The following steps are provided if it is necessary to use welded lifting lugs for vertical transfer of the TRUPACT-II packages to a replacement TRUPACT-II transport trailer.

NOTE: Retrieve three weld-on lifting lugs and a welding rod from the TRUPACT-II tractor.

CAUTION: Take appropriate safety measures to prevent eye damage to the welder and/or bystanders and prevent fire or personnel burns from sparks and hot welding materials.

1) Attach the lugs to the TRUPACT-II package as shown in Attachment 3. The welder should meet American Society of Mechanical Engineers Section 9 qualifications and use process "Shielded Metal Arc Welding", if possible. Attachment time is approximately 45 minutes per lug, including setup. To minimize heat buildup, it is suggested that lugs be tacked in place and then welded alternately, one rod per lug.

2) Attach a three-legged, equal-length lifting sling from the lifting lugs to the crane hook as shown in Attachment 3.

3) Slowly increase tension on the lifting cables until the TRUPACT-II package is just clear of the trailer at all locations and verify that the TRUPACT-II package is hanging securely.

4) Minimizing the lift to the minimum height required, place the TRUPACT-II package on the replacement TRUPACT-II trailer.

5) Secure the vertical TRUPACT-II package to the replacement TRUPACT-II trailer with the standard U-bolt tiedowns, in accordance with the normal transport procedure.

TRUPACT-II RECOVERY EQUIPMENT LIST

NOTE: The hoisting slings and lift components must have current proof load certification labels/tags attached and be checked prior to use for lifting in the recovery operation.

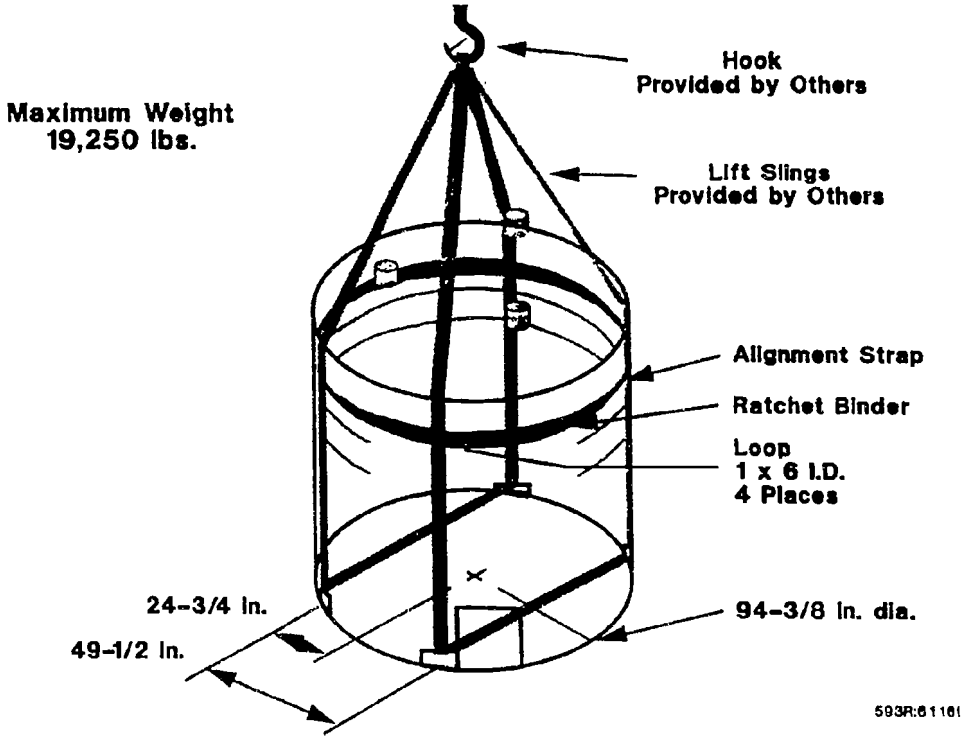
QUANTITY	DESCRIPTION
	(This equipment is carried on the truck.)
13	Weld-on handling and lift lugs - special design
12 lb.	Welding rod - Type 304 stainless steel, type 308-L16, 3/32 inche
1	Lift sling alignment strap
	PROVIDED AT THE SCENE
	(This equipment is to be obtained from the nearest commercial vendor.)
1	Portable welder - 225 amp. operator ASME Section 9 Qualified - Process SMAW "Shielded Metal Arc Welding"
1	Oxy/acetylene torch with tanks, regulator and operator
1	Mobile crane - 50-ton capacity with two boom hooks and drag cable (minimum)
1	Tractor - TRUPACT-II fleet unit (or equivalent)
2	Flatbed trailer - 40,000-pound capacity with suitable commercial side-mounted tiedown structure (deck to have a significant wood area to fasten nail blocking and bracing to)
6	Cable slings - 5 feet, 2 eyes with safety clips, 10-ton SWL
6	Cable slings - 15 feet, 2 eyes with safety clips, 10-ton SWL
4	Cable slings - 30 feet, 2 eyes with safety clips, 10-ton SWL
2	Chain sling - three equal-length legs with grab hooks, 10 foot leg length, large pear ring, 10-ton SWL
6	Steel coil chain - 1/2 inch, 25 feet long with a hook on each end
6	Chain binder - 1/2 inch coil chain capacity with a hook on each end
12	Nylon rigging strap - 25 feet, 7-1/2-ton safe working load, eyeloops on both ends
12	Nylon web tiedown straps - 25 foot length
10	Shackles - 5-ton safe working load
1	16-ton forklift with 7 foot long tines (if required)

TRUPACT-II RECOVERY EQUIPMENT LIST
(cont.)

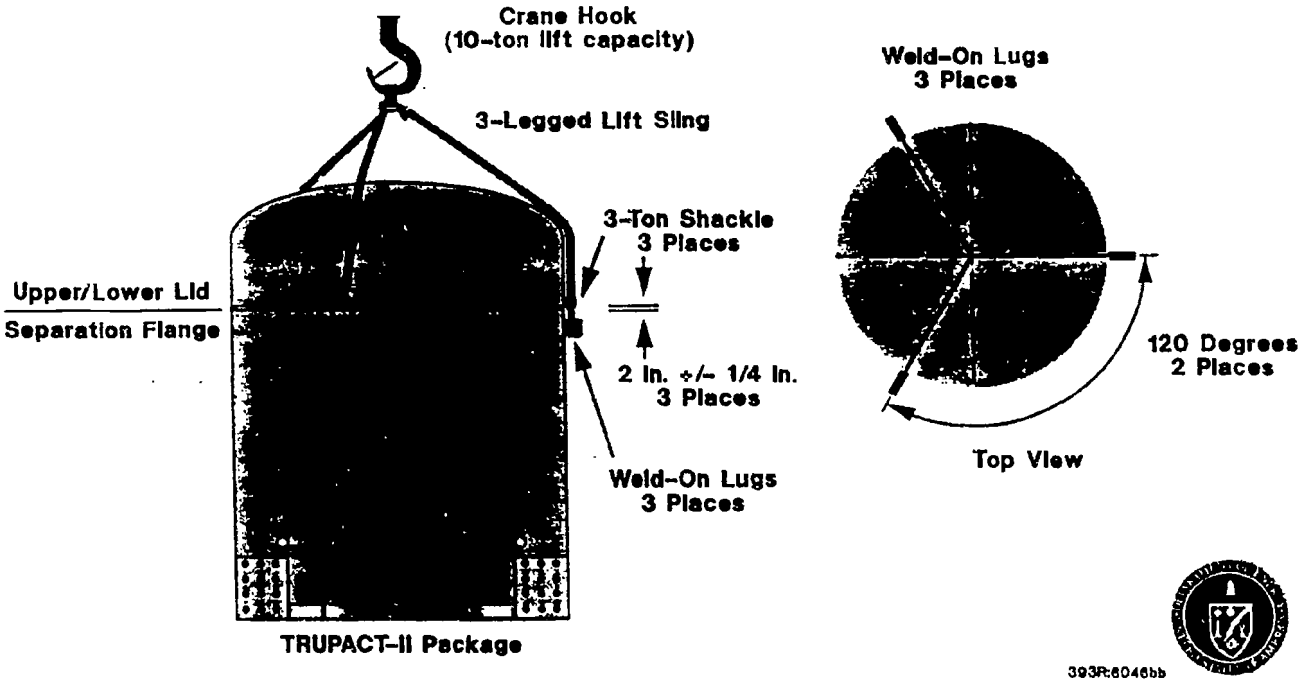
QUANTITY	DESCRIPTION
	(This equipment is carried on the truck.)
10	Shackles - 10-ton safe working load
3	Snatch blocks - 10-ton safe working load
3	Come-along hoists - 5-ton safe working load
3 sets	Transport saddles/cradles - two units (1 set)/TRUPACT-II package
18	Wood blocks - 6" x 8" x 24", 1-1/2" bevel on one 6" side
1 set	Wrenches/tools - TRUPACT-II tiedown related

Nighttime operation will require portable lighting. Additional equipment such as shovels, picks, axes, sledge hammers, etc., may be required as the situation merits and should also be obtained from the nearest commercial vendor

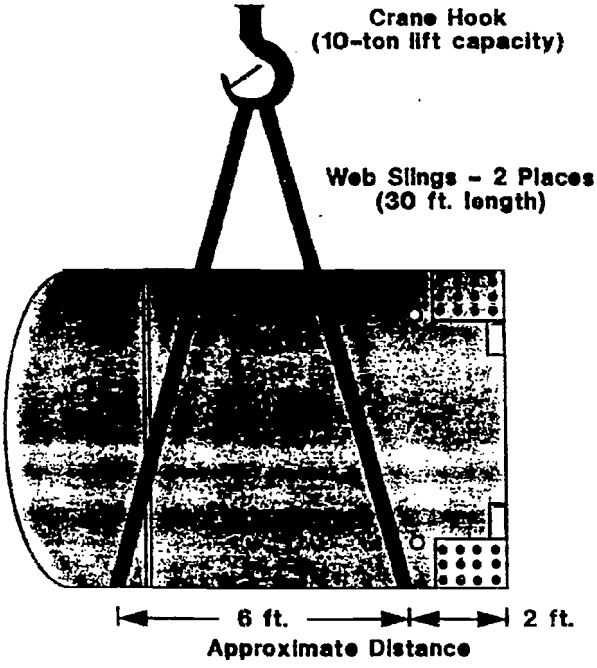
LIFT SLING ALIGNMENT STRAP



VERTICAL PACKAGE LIFTING



RIGGING FOR HORIZONTAL PACKAGE LIFTING (WEB SLING)



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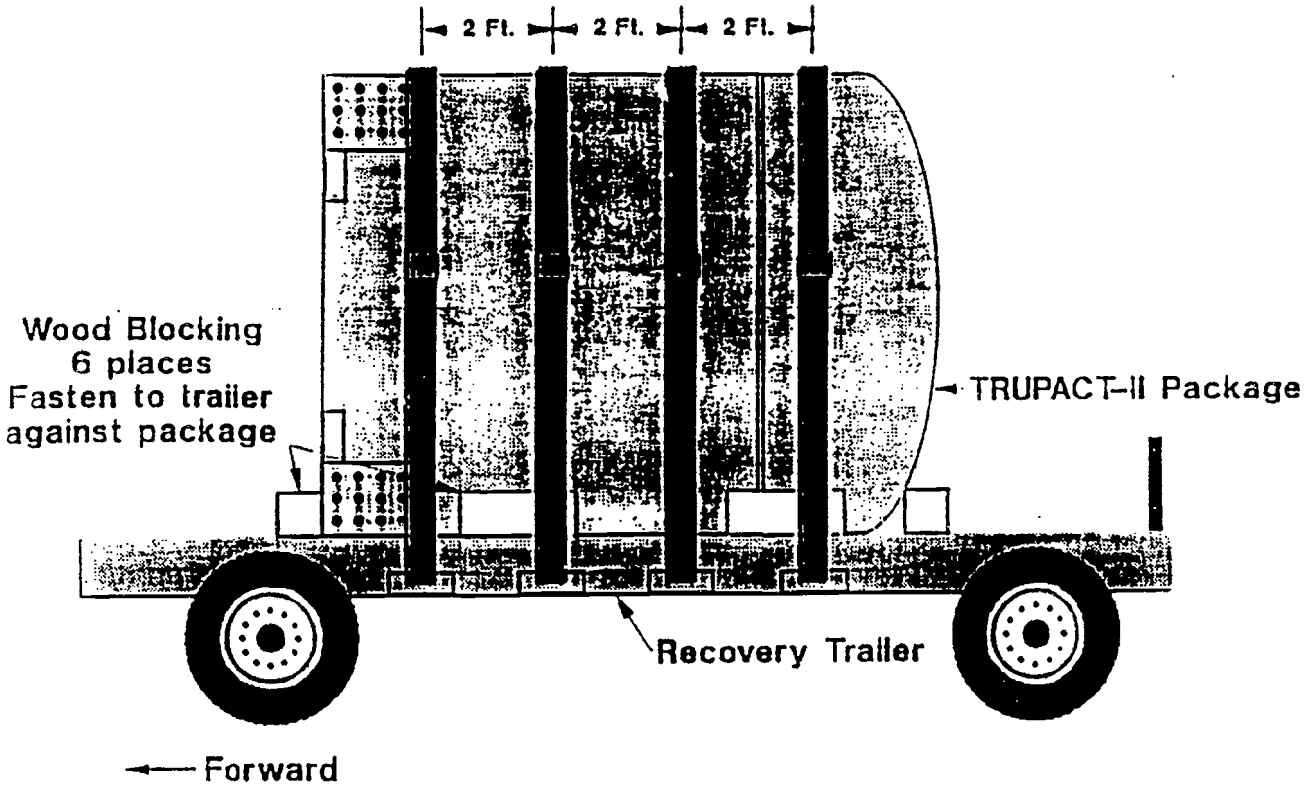
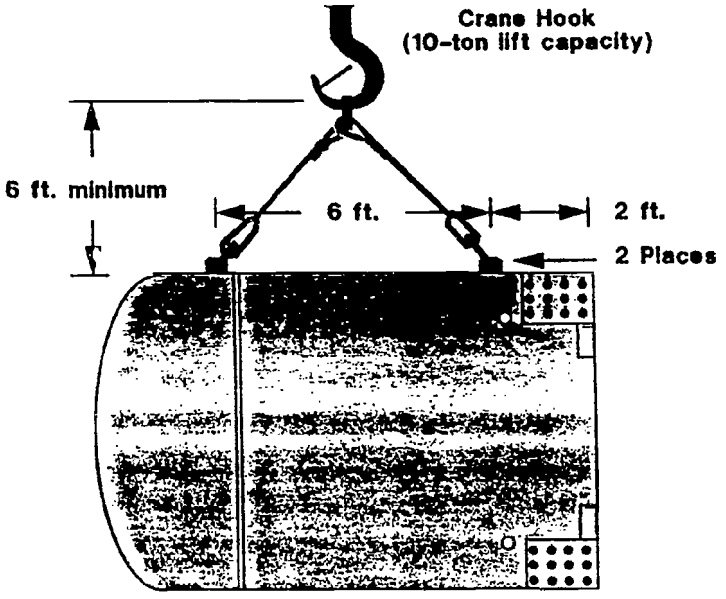
HORIZONTAL PACKAGE TRANSPORT SECURING



HORIZONTAL PACKAGE LIFTING WITH WELD-ON LUGS



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COURSE TERMINAL OBJECTIVE

Successful completion of this course will provide first responders with the necessary knowledge to respond safely and to protect themselves, the public, and the environment and will be able to describe the function of the Incident Command System, the Radiological Assistance Team procedures, and the TRUPACT-II recovery methods.

Mastery of the course terminal objective will be demonstrated by scoring 70% or higher on the post course examination, and showing a proficiency of skill using the landscape models.

NOTE: The next three pages in this section will be utilized in the practical exercise on the landscape models. The instructors will provide scenario information and provide time to establish Response Team elements such as On-Scene Commander, PIO, first on scene, etc.

SCENARIO SHEET

SCENARIO DATA

TIME FRAME

DAY OF WEEK _____

TIME OF DAY _____

WEATHER

TEMPERATURE _____

WIND DIRECTION _____

WIND SPEED _____

PRECIPITATION _____

FOG

MATERIALS INVOLVED

PLACARD (S) _____

LABEL (S) _____

TRANSPORT INDEX _____

MATERIAL NAME _____

INCIDENT FACTORS

PEDESTRIANS _____

TRAFFIC CONDITIONS _____

ROAD CONDITIONS _____

SITUATION

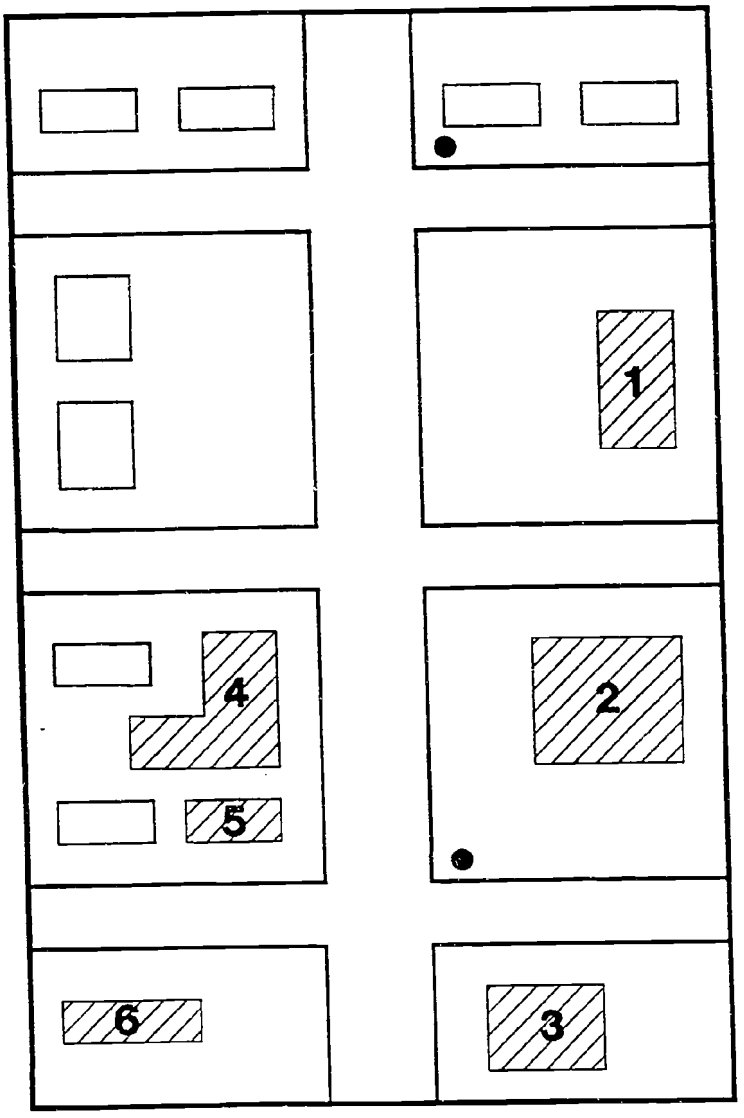
_____

_____

_____

_____

_____



(not to scale)

N

Residential

Fire Hydrant

Commercial

1. Auto Dealership
2. Burger King
3. Pizza Hut
4. Gas Station
5. Convenience Store
6. Small Shopping Center

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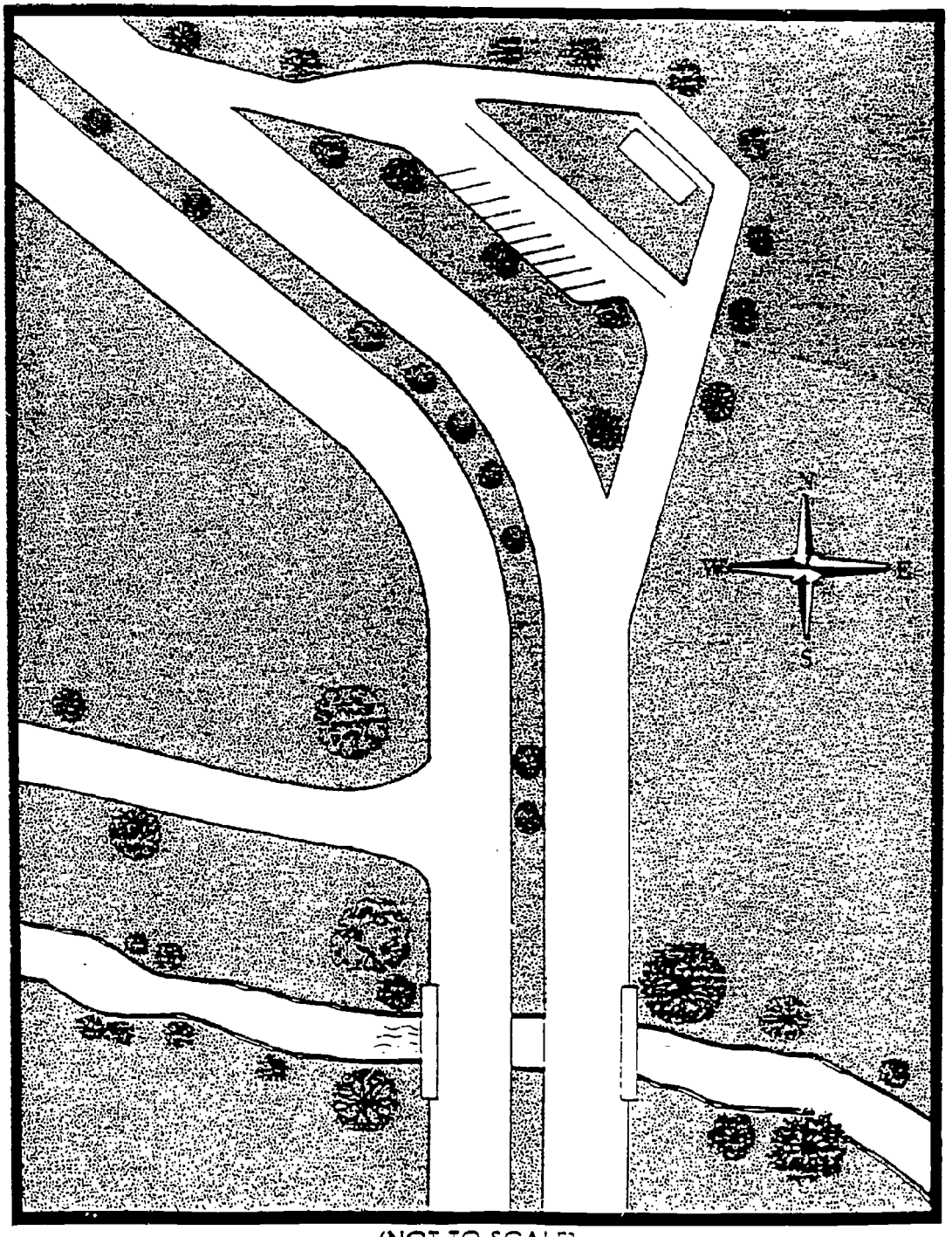
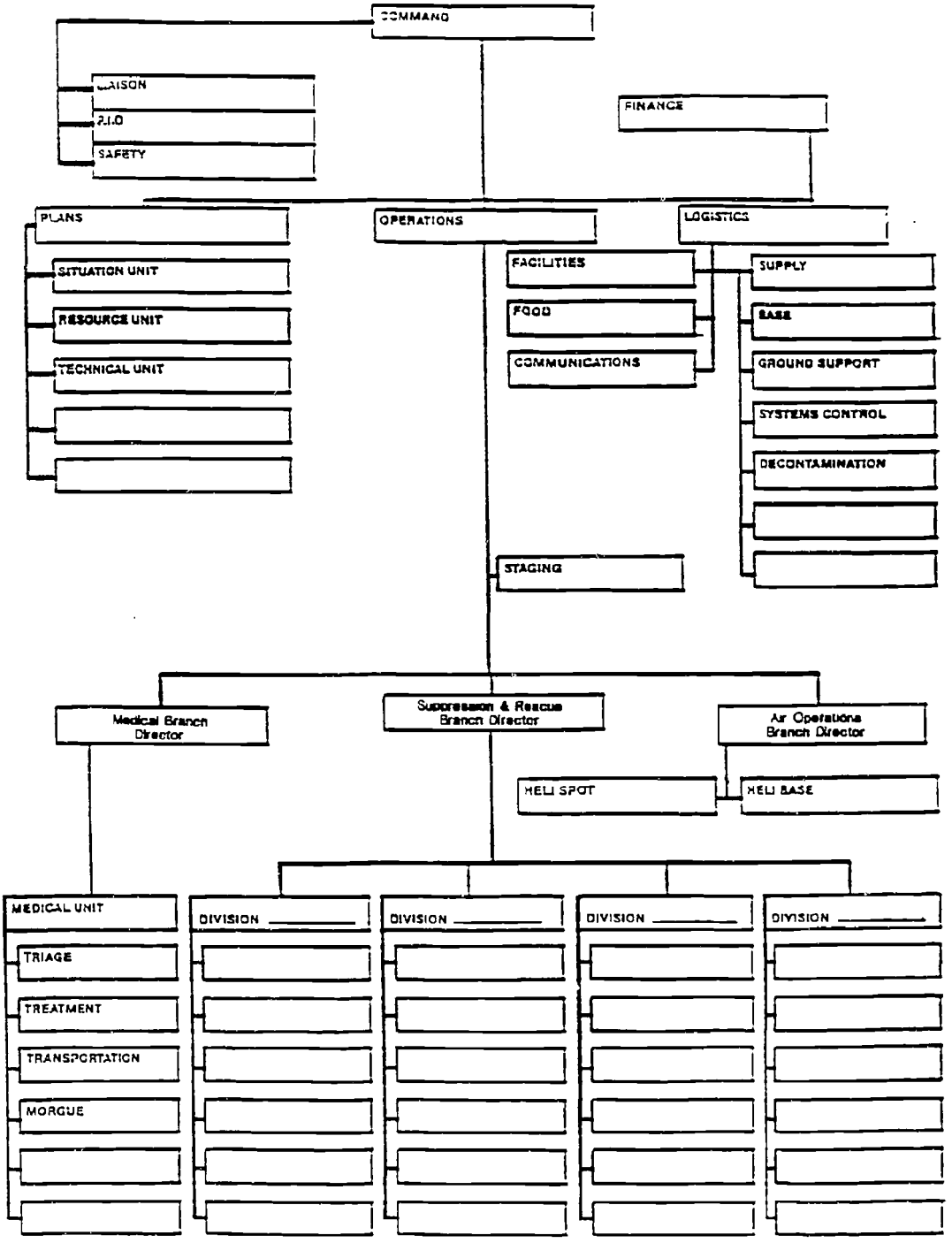


(NOT TO SCALE)

Section 12
SAMPLE FORMS AND CHECKLISTS

1. INCIDENT COMMAND SYSTEM MATRIX
2. FIRE AND HAZ-MAT WORKSHEET
3. DECISION MATRIX
4. FIELD REPORT
5. HAZARDOUS MATERIALS INCIDENT EVALUATION
6. RESOURCE LIST

INCIDENT COMMAND SYSTEM



FIRE AND HAZ-MAT WORKSHEET

INCIDENT INFORMATION

INCIDENT NAME	RADIO FREQ
AREA	TIME
ADDRESS	
OCCUPANT	PHONE NUMBER
DBA	
OWNER	
ADDRESS	PHONE NUMBER
STAGING LOCATION	
DAMAGE-STRUCTURE	CONTENTS

RESOURCES

CO	STAG	ASSIGNMENTS

CURRENT WEATHER INFORMATION

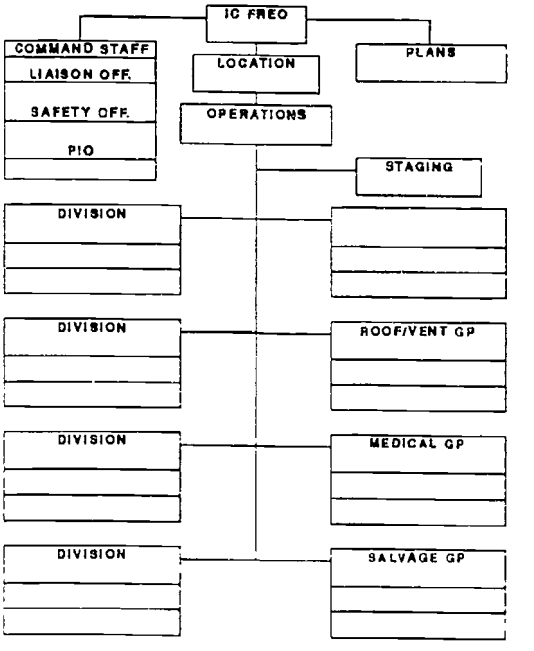
TIME			
WIND DIRECTION	W N S E	W N E	W N S E
WIND SPEED			
FORECAST:			

TACTICAL OBJECTIVES

ASSIGN	COMP	
____	____	RESCUE (PRIMARY SEARCH)
____	____	EVACUATION
____	____	EXPOSURES (INT & EXT)
____	____	SPRINKLERS CHARGED
____	____	ATTACK LINES
____	____	UTILITIES SHUT OFF (GAS, WATER, ELECTRIC)
____	____	VENTILATION
____	____	SALVAGE

HAZARDOUS MATERIALS DATA

ID	GUIDE	MATERIAL NAME	EVAC. DIST.	
			FT.	
FLASH POINT	SPEC. GRAVITY	MANUFACTURER/ SHIPPER	X	
	FOR DENSITY		FT.	



CHECKLIST

HAZ-MAT CONSIDERATIONS

- ☐ UP-HILL/UP WIND
- ☐ STATIC OR MOVING
- ☐ FULL PROTECTIVE CLOTHING
- ☐ RESCUE
- ☐ EVACUATION SITE
- ☐ ISOLATE CONTAMINATED AREA
- ☐ DIKING/CHANNELING
- ☐ IDENTIFY MATERIAL
  - ☐ ID RESPONSIBLE PARTY
  - ☐ DOT PLACARD
  - ☐ MAT. SAFETY DATA SHEETS
  - ☐ SHIPPING PAPERS
- ☐ FOAM UNIT
- ☐ AIR UNIT

HAZ-MAT OUTSIDE AGENCIES

- ☐ POLICE/TRAFFIC CONTROL
- ☐ HAZ-MAT TEAM
- ☐ HEALTH DEPT.
- ☐ VACUUM TRUCK
- ☐ PUBLIC SERVICE
  - ☐ STREET DIV.
  - ☐ STORM DRAIN DIV.
- ☐ FLOOD CONTROL
- ☐ FISH & GAME
- ☐ OES (MORE THAN 42 GAL. SPILL)
- ☐ RED CROSS (EVAC. SITE)

FIRE CONSIDERATIONS

STANDARD OPERATIONS

- ☐ SIZE UP REPORT
- ☐ ADDITIONAL ALARMS
- ☐ C/P LOCATION
- ☐ STAGING LOCATION
- ☐ GET AN AIDE
- ☐ PIO
- ☐ FIRE INVESTIGATOR

BUILDING

- ☐ PRE FIRE PLAN
- ☐ HAZARDOUS MATERIALS
  - ☐ PLACARD
- ☐ COMPANY REP.
- ☐ BLDG. CONSTRUCTION
- ☐ ROOF CONSTRUCTION
- ☐ OVERHEAD WIRES

RESCUE

- ☐ PRIMARY SEARCH
  - ☐ ALL CLEAR
- ☐ REFUGE AREAS
- ☐ SECONDARY SEARCH

FIRE CONTROL

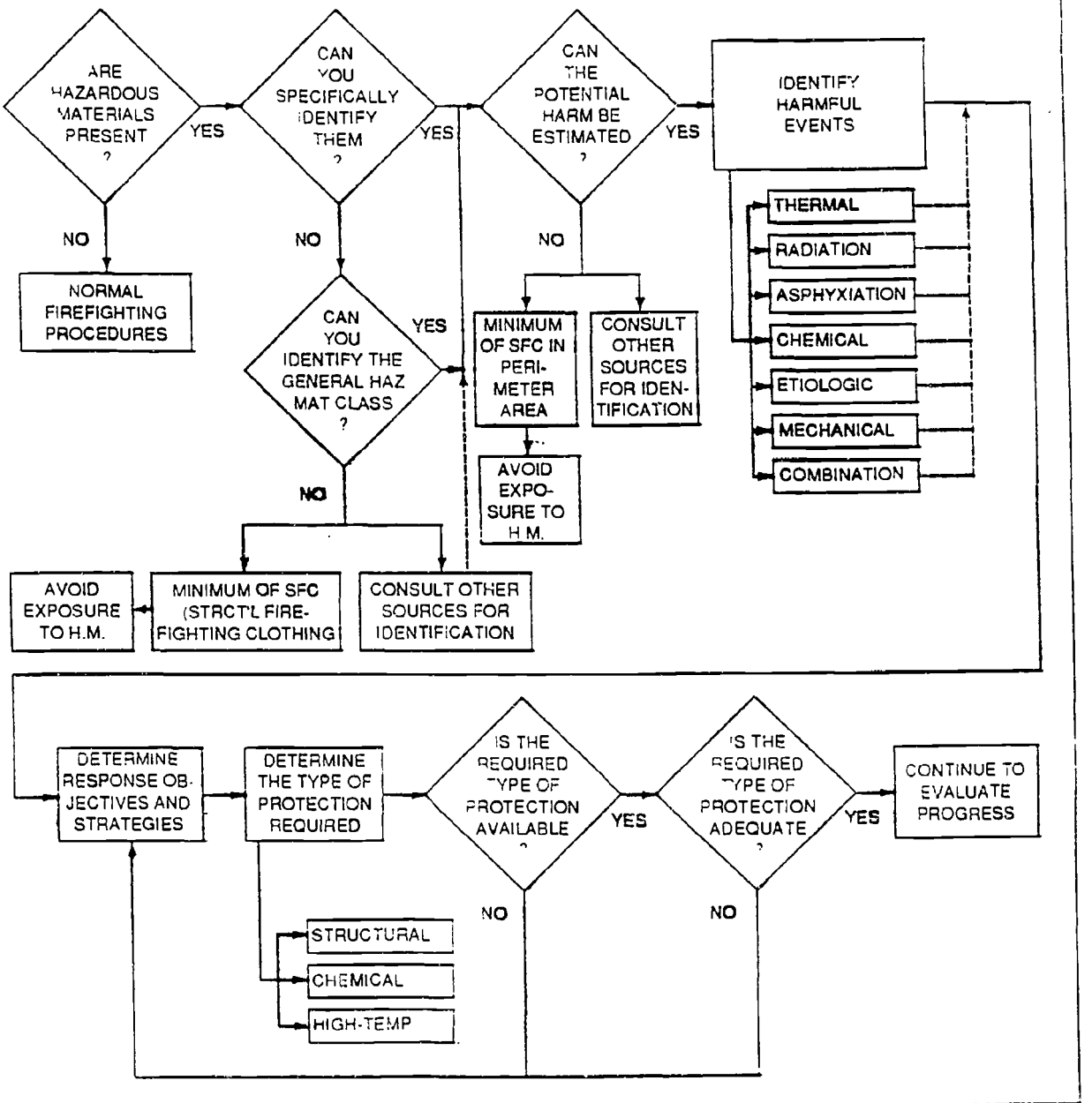
- ☐ EXPOSURES
  - ☐ INTERIOR & EXTERIOR
- ☐ ATTACK LINES
- ☐ VENTILATION
- ☐ SALVAGE

FIRE OUTSIDE AGENCIES

- ☐ POLICE/TRAFFIC CONTROL
- ☐ PUBLIC SERVICE
- ☐ AUXILLARY
- ☐ RED CROSS
- ☐ UTILITY COMPANIES
  - ☐ ELECTRIC
  - ☐ GAS
  - ☐ WATER
  - ☐ TELEPHONE

REMARKS

A DECISION MATRIX



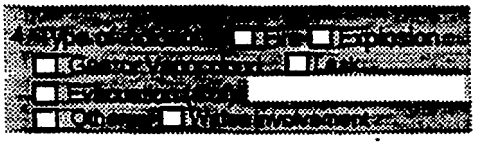
FIELD REPORT

INCIDENT I.D. # ☐☐☐☐☐☐ Date: __/__/__
Time: _____
Recv'd by: _____

1. Caller: _____ 2. Call back number: ( ) _____

3. Caller represents: _____

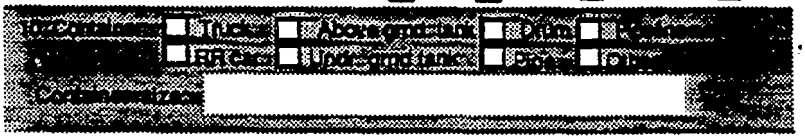
Caller notified: _____ Arrived: _____



☐ In
5. Incident Location ☐ Near _____ _____
City County Milepost ____ ☐ R.R. ☐ River ☐ Hwy
Sec. ____ Twp. _____ Range _____

6. Area involved: ☐ Highway ☐ Waterway ☐ Rail ☐ Other _____ 7. Material(s) involved (spell): _____

8. Contact Person: _____ _____
☐ Gas ☐ Liquid ☐ Semisolid ☐ Solid



9. Label _____
Placard _____
Radioactive ☐ I ☐ II ☐ III

11. Amt. released: _____ 12. Cause of release: _____
Rate of release: _____ 13. Est. Spill Extent: _____ ☐ Sq. Ft. ☐ Sq. Yd.

14. Incident ☐ Occurred Date: __/__/__ Time: _____
☐ Discovered Date: __/__/__ Time: _____

15. Local emergency unit(s) contacted:
☐ Fire _____
☐ Sheriff _____
☐ Police _____
☐ Local ESDA _____
☐ Other _____

On-scene:
☐ Fire _____
☐ Sheriff _____
☐ Police _____
☐ Local ESDA _____
☐ Other _____

16. On-scene contact: _____ 17. No. injured: _____ Extent of: _____

18. On-scene phone #: ( ) _____ _____

Where taken: _____

☐ Hazmat related

19. Public Safety concerns: _____

_____

_____

20. What immediate technical or field assistance is needed from any State Agency? _____

_____

_____

_____

- OVER -

For emergency information on Hazardous Materials, call CHEMTREC: 1-800-424-9300

21. WEATHER: ☐ Sunny ☐ Ptly. Cldy. ☐ Overcast ☐ Rain ☐ Snow
Temperature: _____ F° -- Wind Direction: _____ Speed: ____

22. ☐ PESTICIDE: ☐ Spill ☐ Fire Where: ☐ Soil ☐ Water Damage: ☐ Plants ☐ Livestock ☐ People

23. Containment/Cleanup actions & plans _____

_____

_____

24. Responsible party: _____

_____ Phone: ( ) _____

Mailing Address: _____

_____

25. Incident terminated: Date ___/___/___ Time: _____ By whom: _____

26. Other incident information: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

HAZARDOUS MATERIALS INCIDENT EVALUATION

Incident#	County where incident occurred	Name and title of person completing report

Organization completing report	Address (City/State)	Zip	Tel.#
			( )

Your Organization

- ☐ 1 Private (specify) _____
- ☐ 2 Municipal
- ☐ 3 County
- ☐ 4 State
- ☐ 5 Other Government (specify) _____

Your Function

- ☐ 1 Spiller/Spiller's Representative
- ☐ 2 Fire Fighting
- ☐ 3 Law Enforcement
- ☐ 4 Hazardous Materials Contractor
- ☐ 5 Emergency Medical
- ☐ 6 Emergency Management
- ☐ 7 Environmental Protection
- ☐ 8 Other (specify) _____

Actions Taken by Your Organization (X as many as apply)

- ☐ Security/Crowd control
- ☐ Spill Mitigation
- ☐ Clean-up/Recovery
- ☐ Medical Assistance
- ☐ Fire Fighting
- ☐ Rescue
- ☐ Public Information/Warnings
- ☐ Technical Assistance/Sampling
- ☐ Other _____

Incident Information (give date & time)

	MO.	DAY	YR.	Time (24 hr. clock)
When did incident occur?				
When was your organization notified?				
When did you initially respond?				
When did you arrive on the scene?				
When did you terminate operations?				

Initial Response Was

☐ 1 - By telephone ☐ 2 - On-scene ☐ 3 - Not needed

Number of Hazardous Materials Related

Injuries: ☐☐☐ Deaths: ☐☐☐

Spill Origin

- ☐ 1 Highway
- ☐ 2 Plant Processing
- ☐ 3 Pipeline
- ☐ 4 Waterway
- ☐ 5 Loading Dock
- ☐ 6 Oil Field
- ☐ 7 Rail
- ☐ 8 Other (specify) _____
- ☐ 9 Storage Area
- ☐ 10 Fixed Facility
- ☐ 11 Agricultural

Was more than one chemical involved? ☐ Yes ☐ No

Primary Commodity Involved:

UN# ☐☐☐☐ (or) NA# ☐☐☐☐

Chemical Name: _____

Trade Name: _____

Type:

- ☐ 1 Gas
- ☐ 2 Liquid
- ☐ 3 Semi-solid
- ☐ 4 Solid

Container

- ☐ 1 Truck
- ☐ 2 Railroad car
- ☐ 3 Drum
- ☐ 4 Pipeline
- ☐ 5 Process pipe
- ☐ 6 Aboveground tank
- ☐ 7 Underground tank
- ☐ 8 Other (specify) _____

Unit of Measure

- ☐ 1 Pounds (preferred unit)
- ☐ 2 Gallons
- ☐ 3 Curies
- ☐ 4 Cu. ft.(natural gas)

Estimated Amount

At risk:	☐☐☐☐☐☐
Released:	☐☐☐☐☐☐
Recovered:	☐☐☐☐☐☐

RESOURCES USED: Man-hours: ☐☐☐☐☐ Replacement Costs: ☐☐☐☐☐☐

RESOURCE LIST

OFFICIAL OR SERVICE	CONTACT PERSON	PAGE	PHONE
Air National Guard			
Airports			
Ambulances			
American Red Cross			
Apparatus Repairs			
Apparatus Tires			
Army Ordinance Demolition			
Attorney			
Barge Lines (Tug)			
Barricades			
Board of Education			
Board-Up Service			
Boats, Rescue, Evacuation			
Chain Saws			
Chemical Data (Mfgrs)			
Chemical Response Information			
CHEMTREC			
Churches			
Circular Saws			
Civil Defense Organizations			
Citizen Band Radio Club			
City Engineer			
City Manager			
Clergy			
Compressed Air			
Communications Center			
Communications Center (Mobile)			

OFFICIAL OR SERVICE	CONTACT PERSON	PAGE	PHONE
Construction Equipment			
Divers Equipment			
Doctors			
Electric Company			
Electrical Engineers			
Environmental Protection Agency			
Evacuation or Accumulation Centers			
F.A.A. (Federal Aviation Administration)			
F.C.C. (Federal Communications Commission)			
Fallout Shelters			
Field Hospital			
Front Loaders			
Fuel Suppliers			
Gas Company			
Gravel, Sand			
Ham Radio Organizations			
Health Department			
Heavy Equipment			
Helicopters			
Highway Departments (State, County, Township)			
Hospitals			
Industries			
Law Enforcement			
Lighting Units (Portable Generators)			

893L:6222

GLOSSARY

ACTIVITY - The rate at which radioactive material emits radiation, stated in terms of nuclear disintegrations occurring in a unit of time. This is commonly referred to as the "curie" (Ci).

ALPHA PARTICLE - Positively charged particle emitted by the nucleus and given off by certain radioactive material. It consists of two neutrons and two protons. It cannot penetrate the outer layer of skin or normal clothing. It is an internal hazard only and must be inhaled, absorbed, or ingested to cause harm.

ATOM - The basic component of all matter. It is the smallest part of an element having all the chemical properties of that element. They are made up of protons, electrons, and neutrons.

BETA PARTICLE - A negatively charged particle emitted in the radioactive decay of certain nuclides. It has a mass and charge equal to that of an electron and has a relatively short range in the air. It is an internal hazard only and is repelled by ordinary clothing and respiratory protection.

BREACH - (Breach Event) The event causing a hazardous material container to open up or "breach". It occurs when a container is stressed beyond its limits of recovery (ability to hold its contents).

CANISTER - The inner component of the remote-handled shipping cask.

CASK - The outermost transport container for remote-handled transuranic waste. It is considered a Type B package.

COLD ZONE - This area contains the command post and such other support functions as are deemed necessary to control the incident. This is also referred to as the "clean zone" or "support zone." (NFPA 4-4.3)[12]

CONTAMINATION REDUCTION ZONE - An area surrounding the "exclusion zone" that is considered safe for workers to enter with protective clothing unless assigned a task requiring increased protection. This zone may also be exposed to the product if the incident worsens before additional assistance arrives. It also may be referred as the "warm zone" or "yellow zone."

CURIE - See "ACTIVITY."

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[12] Recommended Practice for Responding to Hazardous Materials Incidents; National Fire Protection Association, Standard 471;August 1989

DECONTAMINATION - The removal of radioactive contaminating material from the surface or from within another material.

DIKING - Application of a barrier which prevents passage of the material to an area where it will produce more harm. Dikes should be considered only temporary remedies intended to buy time for more complicated tactics.

DIVERSION - Controlled movement of the material to an area where it will produce less harm.[13]

DOSE - The quantity of radiation or energy absorbed by a material including human tissue. It is measured in "rads" (Radiation Absorbed Dose).

EVACUATION - A prolonged, precautionary stay away from an area affected by a hazardous material.

EXCLUSION ZONE - Area immediately surrounding a hazardous materials incident which extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. It is the area of the incident including the product and its container and the immediately exposed area to gases, vapors, mist, dust, smoke, or run-off. This area may also be known as the "restricted zone" or "red zone."

EXPOSURE - A measure of ionization produced in air by x-rays or by gamma radiation. Acute exposure generally refers to a high level of exposure of short duration. Chronic exposure is lower level exposure of long duration.

EXTREMELY HAZARDOUS SUBSTANCE - A chemical defined by the Environmental Protection Agency as extremely hazardous to a jurisdiction due to a spill or release of their toxicities and physical and chemical properties.

FIRST RESPONDER - The emergency medical technicians, fire fighters, law enforcement officials, rescue squad members, or others performing as part of a community emergency care system, or as dictated by the state. This includes both First Responder Awareness and First Responder Operational levels of training.

GAMMA RADIATION - Short-wavelength electromagnetic radiation emitted in the radioactive decay of certain nuclides. They are highly penetrating and require several inches of stainless steel or lead or several feet of concrete for effective shielding.

HALF-LIFE - The time required for a radioactive substance to lose 50% of its activity by decay.

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[13] Hazardous Material, Managing the Incident, Noll, Hildebrand, and Yvorra; Fire Protection Publications, Peake Productions, Inc; Oklahoma State University, 1988; pp 158

HAZARDOUS CHEMICAL - Any chemical which is a physical hazard or a health hazard to employees as defined by the Occupational Safety and Health Act.

HAZARDOUS MATERIAL - (DOT) A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.

HAZARDOUS SUBSTANCE - Usually associated with biological agents or other disease-causing agents as defined in Section 104 (a)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act. Exposure to a hazardous substance may impose serious health effects to employees.

HAZARDOUS WASTE - Discarded materials regulated by the Environmental Protection Agency because of public health and safety concerns. Regulatory authority is granted under the Resource Conservation and Recovery Act. (U.S. Environmental Protection Agency)

INCIDENT COMMAND SYSTEM - The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to the incident.

IONIZING RADIATION - Types of radiation capable of removing one or more electrons from atoms they encounter, leaving positively charged particles such as alpha or beta, and nonparticulate forms such as x-rays and gamma radiation. High doses of ionizing radiation may cause human tissue or cell damage.

ISOTOPES - Different forms of the same chemical element, which are distinguished by having different numbers of neutrons (but the same number of protons) in the nucleus of their atoms.

LIMITED ACCESS ZONE - An area surrounding the "exclusion zone" and is considered safe for workers to enter with protective clothing unless assigned a task requiring increased protection. This zone may also be exposed to the product if the incident worsens before additional assistance arrives. It also may be referred as the "warm zone" or "yellow zone."

NEUTRON - Uncharged particle in a nucleus. They are used to split heavy atoms in the fission reaction.

RAD - See "DOSE."

RADIATION - Particles or waves from atomic or nuclear processes. Prolonged exposure to these particles and rays may be harmful.

RADIOACTIVE - Of, caused by, or exhibiting radioactivity.

RADIOLOGICAL ASSISTANCE TEAM - A group of qualified professionals who provide health physics assessment, radiation control, and measurements for any type of accident involving radiation.

REM - (Roentgen Equivalent Man) Unit used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation.

RETENTION - Temporary containment of the material in an area where it can be absorbed, neutralized, or vacuumed for proper disposal. Retention tactics are intended to be more permanent and may require resources such as portable basins, bladder bags, or other special construction.

SHELTERING IN PLACE - The process of giving instructions to people to remain inside their homes or places of business until the danger passes from a hazardous materials event. This is commonly used for nursing home residents, schools, or others that may be difficult to evacuate.

SHIELDING - Materials, usually concrete, water, or lead, placed around radioactive materials to protect personnel against the danger or radiation. Shielding may be in the form of first responder clothing and/or response gear or vehicles.

SIZE-UP - The rapid, yet deliberate, consideration of all critical scene factors that may influence the safety of all personnel and mitigation of the incident.

SUPPORT ZONE - The area encompassing the "Contamination Reduction Zone" that is restricted to emergency response personnel. This zone is considered safe minimal protective clothing is required. It may also be known as the "cold zone" or "green zone."[14]

TRANSURANIC WASTE - Waste materials, usually contaminated with plutonium, with an atomic number greater the 92. It is produced primarily by defense activities.

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[14] Hazardous Materials For First Responders, International Fire Service Training Association, April 1990, Oklahoma State University, pps. 240-242

Acronyms and Abbreviations Appearing in this Text

ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
Brookhaven	Brookhaven National Laboratory
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CH	contact-handled
CHEMTREC	Chemical Transportation Emergency Center
CMR	Central Monitoring Room at the WIPP
CP	Command Post
CVSA	Commercial Vehicle Safety Alliance
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DOE-AL	U.S. Department of Energy - Albuquerque Office
DOI	U.S. Department of the Interior
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
EEG	Environmental Evaluation Group
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERG	Emergency Response Guide

FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GAO	Government Accounting Office
HAZ-MAT	Hazardous Materials
HM	Hazardous Materials
HQ	Headquarters
HRCQ	Highway Route Controlled Quantity
I/ART	Incident/Accident Response Team - See TART
IC	Incident Commander
ICS	Incident Commander System
IDHA	Identification and Hazard Assessment
Mfgr	Manufacturer
MICRO	one/one millionth
MILLI	one/one thousandth
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NANO	one/one billionth
NAS	National Academy of Science
NFPA	National Fire Protection Association
NMED	New Mexico Environment Department
NOS	Not Otherwise Specified
NRC	Nuclear Regulatory Commission
OES	Office of Environmental Services

OIG	Office of the Inspection General
OSHA	Occupational Safety and Health Administration
PAO	Public Affairs Officer
PIC	Person in Charge
PIO	Public Information Officer
RAD	Radiation Absorbed Dose
RAM	Radioactive Material
RAT	Radiological Assistance Team
RCO	Regional Coordinating Officer, DOE
REAC/TS	Radiation Emergency Assistance Center/Training Site
REM	Roentgen Equivalent Man
SCBA	Self Contained Breathing Apparatus
SFC	Structural Fire Fighting Clothing
SSEB	Southern States Energy Board
SWB	Standard Waste Box
TART	TRUPACT-II Accident Response Team - See I/ART
TRANSCOM	Transportation Tracking and Communication System
TRANSAX	Transportation Accident Exercise
TRU	Transuranic
TRUPACT-II	Transuranic Package Container
WEC	Westinghouse Electric Corporation
WGA	Western Governors
WIEB	Western Interstate Energy Board
WIPP	Waste Isolation Pilot Plant

WPIO	WIPP Project Integration Office
WPSO	WIPP Project Site Office